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IN THE

UNITED STATES COURT OF APPEALS

FOR THE FOURTH CIRCUIT

No 7,294

S. H. KRESS & COMPANY,

Appellant,

vs.

ELIE P. AGHNIDES and CHASE BRASS & COPPER COMPANY, INC.,

Appellees.

Appeal from the United States District Court for the Middle District of North Carolina, Greensboro, North Carolina.

Appendix to Appellant's Brief
Volume 1

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IN THE

UNITED STATES COURT OF APPEALS

FOR THE FOURTH CIRCUIT

No. 7,294

S. H. KRESS & COMPANY,

Appellant,

vs.

ELIE P. AGHNIDES and CHASE BRASS & COPPER COMPANY, INC.,

Appellees.

Appeal from the United States District Court for the Middle District of North Carolina, Greensboro, North Carolina.

Appendix to Appellant's Brief

Volume 1

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(2):

IN THE UNITED STATES DISTRICT COURT

(Caption—Civil Action No. 857-G)

DOCKET ENTRIES.

May 13, 1954	Filed Complaint—(Cash Bond Ledger page 390)
May 13, 1954	Issued Summons to Marshal for service
May 14, 1954	Filed Summons returned executed May 13, 1954 by leaving copy with A. J. Ellis, Mgr. Lomax, Dep. Marshal
June 3, 1954	Filed Order signed by Judge Hayes allowing defendant until July 6, 1954, to file answer.
Jul. 6, 1954	Filed Answer for Deft.
Oct. 8, 1954	Filed Plaintiff's Interrogatories
Nov. 12, 1954	Filed Stipulation extending time to Nov. 12, 1954, for deft to file answers to the Interrogatories.
Nov. 12, 1954	Filed Deft's Answers to Plaintiff's Interrogatories.
Nov. 17, 1954	Filed Notice of Taking Depositions.
Nov. 17, 1954	Filed Notice and Motion for Inspection and Copying
Nov. 22, 1954	Filed Motion for Inspection and Copying
Nov. 22, 1954	Filed Notice
Nov. 22, 1954	Filed Notice of Taking Deposition
Nov. 26, 1954	Filed Notice of Taking Deposition
Dec. 1, 1954	Filed Order for production and copying of documents
Dec. 8, 1954	Filed Reply to Counterclaim
Dec. 21, 1954	Filed Notice of Motion & Motion to strike Reply to Counterclaim

Dec. 21, 1954	Filed Notice of Motion & Motion for leave to file Amendment to Answer.
Dec. 21, 1954	Filed Motion for leave to file Reply to Counterclaim
Dec. 30, 1954	Filed Notice
Dec. 30, 1954	Filed Notice of Taking Deposition.
Dec. 30, 1954	Filed Motion for inspection and copying
Jan. 6, 1955	Filed Order for Production & copying of documents
Jan. 10, 1955	Filed Affidavit
Jan. 13, 1955	Filed Depositions
(3):	
Jan. 17, 1955	Filed Deposition of Elie P. Aghnides, C. H. Williamson, Arthur E. Guerber, Sidney Shames and Harold Shames.
Jan. 20, 1955	Filed Amendment to Answer—Service Accepted.
Jan. 26, 1955	Called for trial before Judge Hayes, without Jury
Jan. 26, 1955	Motion for 2nd Count of Complaint be dismissed by defendant. Motion overruled. Move by Plaintiff to Amend Complaint and include Chase Brass and Copper Co. Inc., as plaintiff. Motion granted 2 plaintiff witnesses sworn.
Jan. 27, 1955	Trial continues
Jan. 28, 1955	Trial continues—Adjourns to Monday 23, 1955.
Jan. 28, 1955	Filed Order signed by Judge Hayes allowing Chase Brass and Copper Co. Inc., as an additional party plaintiff.
Feb. 11, 1955	Filed Defendant's Second Answer.
Feb. 17, 1955	Filed Reporter's Transcript of Evidence
Feb. 28, 1955	Filed Reply to Counterclaim
Sept. 19, 1955	Filed Notice of Taking Depositions.

Sept. 19, 1955	Filed Plaintiff's Interrogatories.
Sept. 21, 1955	Filed Depositions of Earl E. Brown, et al.
Oct. 3, 1955	Filed Motion Under Rule 30 (d) to terminate examination and affidavits
Oct. 7, 1955	Filed Deposition of Garrett Findlay Muho, et al.
Oct. 10, 1955	Trial continues with evidence for plaintiff.
Oct. 11, 1955	Trial continues with evidence for plaintiff.
Oct. 12, 1955	Trial continues with evidence for plaintiff.
	1 plaintiff witness sworn
	Plaintiff rests
	Evidence for Defense offered.
	Depositions opened by Nelson B. Castevens in open court
	1 defense witness sworn
Oct. 13, 1955	Trial continues with evidence for defendant
Oct. 13, 1955	Defendant Rests
	Court adjourned to Dec. 6, 1955 because of sudden illness of Mr. Ely, Chief Attorney for Plaintiff
Oct. 13, 1955	Filed Defendant's Second Amendment to Answer
Oct. 31, 1955	Filed Transcript of Proceedings—Volume #2 Court Reporter
Jan. 16, 1956	Filed Defendant's Main Brief for Proposed Findings and Conclusions of Law.
(4):	
Jan. 17, 1956	Filed Brief for Plaintiff and Proposed Findings of Fact and Conclusions of Law
Jan. 26, 1956	Filed Motion to Reopen for Additional Proofs together with Memorandum and affidavit of Will Freeman
	Certified copy of file wrapper of Aghnides' Canadian Patent 490,112 and Charts 1 and 2.

VOL. I

Feb. 1, 1956	Filed Reply Brief for Plaintiff
Feb. 6, 1956	Filed Plaintiff's Memorandum, Re: Deft's Motion to Reopen
Feb. 13, 1956	Filed Supplemental Memorandum in support of Deft's Motion to reopen for additional proofs.
Apr. 17, 1956	Filed Order signed by Judge Hayes denying Motion to reopen case.
May 7, 1956	Filed Findings of Fact and Conclusions of Law
May 7, 1956	Filed Defendant's Proposed Findings of Fact and Conclusions of Law (Refused)
May 7, 1956	Filed Opinion—Hayes Judge
May 22, 1956	Filed Decree in favor of plaintiff
May 23, 1956	Filed Order allowing Defendant's Exceptions
June 12, 1956	Filed copy of Decree served on June 6, 1956, at 114 5th Ave., New York, as to S. H. Kress & Company and on June 6, 1956, at 432 Austin Place, New York as to Melard Mfg. Corp.
June 19, 1956	Filed Notice of Appeal, copy to Brooks, McLendon, Brim & Holderness and Ely, Frye & Hamilton, Attys. for Plaintiff.
June 19, 1956	Filed Bond on Appeal (Cash Bond—Ledger page 56)
July 5, 1956	Filed Notice of Motion—Service accepted
July 5, 1956	Filed Motion for extension of time to docket appeal in Court of Appeals.
July 12, 1956	Filed Order extending time to docket case on appeal to Sept. 7, 1956
July 12, 1956	Filed Order that Judgment be stayed pending determination of Appeal and fixing Supersedeas Bond at $1,750.00

Aug. 16, 1956	Filed Defendant-appellant's designation of Record
Aug. 30, 1956	Filed Motion for Order respecting physical Models, Diagrams and Exhibits
Aug. 30, 1956	Filed Notice of Motion
Aug. 31, 1956	Filed Supersedeas Bond
Aug. 31, 1956	Filed Plaintiff's Comments on Deft's Motion Respecting Physical Exhibits
Aug. 31, 1956	Filed Objection to Improper Inclusion of Material In Record on Appeal.

(5):

Sept. 4, 1956	Filed Notice of Motion in open Court to release exhibits to Attorneys pending appeal.
Sept. 4, 1956	Called for hearing on deft's motion to release the exhibits pending appeal in Fourth Circuit Motion denied.

(7):

IN THE UNITED STATES DISTRICT COURT

(Caption—Civil Action No. 857-G)

COMPLAINT.

COUNT 1.

Plaintiff for a first and separate count alleges:

1. That this action arises under the Patent Laws of the United States and jurisdiction is invoked under Title 28, United States Code, Section 1338.

2. That plaintiff resides at 46 West 54th Street, New York, 19, New York.

3. That defendant, S. H. Kress & Company, is a New York corporation, domesticated in North Carolina December 31, 1938, and having a regular established place of business at Greensboro, North Carolina, where and else-

where the infringement complained of herein has been committed.

4. That plaintiff is the patentee and owner of the following United States Letters Patent:

No. 2,210,846 Issued August 6, 1940
No. 2,316,832 Issued April 20, 1943

5. That plaintiff has the entire right and interest to sue and recover for all infringements of said patents.

6. That the inventions described and claimed in said patents are of great value and have gone into widespread use, as the result of extensive manufacture and sale of devices embodying said inventions by responsible manufacturers operating through licenses under said patents.

7. That devices manufactured and sold under said pattents have been plainly marked with the required statutory notice of said patents.

(8):

8. Upon information and belief that defendant has been and still is infringing said patents by selling devices known as "Mel-O-Flo Jet Aerators," which aerators embody the inventions of the aforesaid patents.

9. That plaintiff has been damaged and defendant has profited from the said infringement.

COUNT 2.

Plaintiff for a second and separate count realleges the allegations of paragraphs 1, 2, 3, 4, 6 and 7 of Count 1 and further alleges:

10. That plaintiff has the entire right and interest to sue to enjoin all infringements of said patents.

11. Upon information and belief defendant is infringing said patents by selling devices known as "Mel-O-Flo Jet Aerators", and will continue to do so unless enjoined by this Court.

12. That plaintiff is being injured and will continue to be injured by said infringements unless said infringements are enjoined by this Court.

Wherefore, plaintiff prays:

1. With respect to Count 1, that an accounting be ordered compelling defendant to pay to plaintiff all damages resulting from defendant's infringement.

2. With respect to Count 2, that preliminary and final injunctions be issued against further infringement of said patents by defendant, and those in privity with defendant.

3. That plaintiff's costs be assessed against defendant, together with reasonable attorneys' fees.

4. That plaintiff be granted such other and further relief as the Court may deem proper.

Elie P. Aghnides, Plaintiff
Brooks, McLendon, Brim & Holderness

(9):

IN THE UNITED STATES DISTRICT COURT

(Caption—Civil Action No. 857-G)

ANSWER.

S. H. Kress & Company, Defendant in the above-entitled cause, by its attorneys, for Answer to the Complaint of the Plaintiff herein states:

In Answer to Count I of the Complaint.

1. Defendant admits the allegations of Paragraph 1 of the Complaint.

2. Defendant admits the allegations of Paragraph 2 of the Complaint.

3. (Answering Paragraph 3 of the Complaint.) Defendant admits that it is a New York corporation having a regular established place of business at Greensboro, North

Carolina. Defendant denies that it has committed any act of infringement, as alleged by Plaintiff, either in Greensboro, North Carolina, or elsewhere in the United States. (10):

4. (Answering Paragraph 4 of the Complaint.) Defendant admits that the Plaintiff is the patentee of United States Letters Patent Nos. 2,210,846 and 2,316,832. Defendant is without knowledge as to the legal and/or equitable ownership of said patents, and, therefore, leaves Plaintiff to his proofs thereof.

5. (Answering Paragraph 5 of the Complaint.) Defendant is without knowledge as to Plaintiff's rights and interests in said patents, and, therefore, leaves Plaintiff to his proofs thereof.

6. (Answering Paragraph 6 of the Complaint.) Defendant is without knowledge or information as to any use, manufacture, or sale of devices by manufacturers allegedly operating through licenses under the aforementioned patents, and, therefore, leaves Plaintiff to his proofs thereof. As to the alleged invention described and claimed in said patents, Defendant denies that they are of great value and have gone into widespread use, and further, upon information and belief, Defendant affirmatively alleges that none of the structures shown and described in Patent No. 2,210,846 has ever been manufactured and/or sold commercially in the United States.

7. (Answering Paragraph 7 of the Complaint.) Defendant is without knowledge as to the allegations therein, and, therefore, leaves Plaintiff to his proofs thereof. (11):

8. (Answering Paragraph 8 of the Complaint.) Defendant admits that it has sold devices known as "Mel-O-Flo Jet Aerators", but denies all the other allegations in Paragraph 8. Defendant specifically denies that it has

infringed the patents set forth in the Complaint by its sale of said aerators, and further, Defendant specifically denies that said "Mel-O-Flo Jet Aerators" which it sells embody the alleged inventions of said patents.

9: (Answering Paragraph 9 of the Complaint.) Defendant denies that Plaintiff has been damaged by any act of the Defendant, and Defendant further denies that it has profited from any infringement of said patents.

In Answer to Count II of the Complaint.

10. (Answering Paragraph 10 of the Complaint.) Defendant is without knowledge as to the allegations therein, and, therefore, leaves Plaintiff to his proofs thereof.

11. (Answering Paragraph 11 of the Complaint.) Defendant specifically denies that it has infringed, or is infringing, any of the patents set forth in the Complaint by reason of its sale of "Mel-O-Flo Jet Aerators", and Defendant further denies the other allegations set forth.

12. (Answering Paragraph 12 of the Complaint.) Defendant denies that it has infringed, or is infringing, any of the patents set forth in the Complaint. Defendant further denies that Plaintiff has been, or will be, injured by its sale of "Mel-O-Flo Jet Aerators". Defendant denies that Plaintiff is entitled to an injunction, either preliminary or final, of the type which would restrain Defendant from continuing to sell "Mel-O-Flo Jet Aerators".

(12):

And as Further and Affirmative Defenses, This Defendant Alleges as Follows:

13. That United States Letters Patent No. 2,210,846, and the claims therein, were, upon trial of a cause in the United States District Court in Chicago, Illinois, based upon said patent, found to be invalid by District Judge Holly, and that said decision finding Patent No. 2,210,846

invalid was affirmed by the United States Court of Appeals for the Seventh Circuit, in a reported case entitled:

Aghnides *v.* Goodrie et al., 210 F. (2) 859.

(Decided February 24, 1954—Rehearing denied March 31, 1954).

14. That said United States Letters Patent Nos. 2,210,846 and 2,316,832, and each and every one of the claims therein, are invalid, void, and of no effect because the alleged invention, or discovery, purportedly described and claimed in said patents was merely the result of the exercise of the ordinary faculties of reasoning aided by the special knowledge and facility of manipulation which are acquired through habitual and intelligent practice of the art, known as non-inventive mechanical skill, and was not a result of the inventive faculty which it is the purpose of the Constitution and the Patent Laws to encourage and reward.

(13):

15. That each of United States Patent Nos. 2,210,846 and 2,316,832, and each of the claims thereof, are invalid and of no effect in law on the ground that the alleged inventions set forth and claimed therein, or all substantial and material parts thereof, had, prior to the alleged invention thereof by the patentee, or more than two years prior to any effective filing date of the application of said patent, been shown, described, and patented or published

in various patents and printed publications, including the following, among others, to-wit:

United States Letters Patent

Patent No.	*Patentee*	*Date of Issue*
881,548	Claflin	Mar. 10, 1908
1,912,113	Aghnides	May 30, 1933

Foreign Patents

British Patent 6,012	Felten	Mar. 12, 1909
British Patent 136,663	Purser	Dec. 30, 1919
British Patent 323,242	Battersby	Dec. 30, 1929
British Patent 375,066	Aghnides	June 23, 1932
British Patent 405,316	Solomon	Feb. 5, 1934

and in other patents and publications for which Defendant is diligently searching and prays leave to add to this Answer when found.

(14):

16. That United States Letters Patent Nos. 2,210,846 and 2,316,832, and each of the claims therein, are invalid and of no effect in law on the following grounds:

(a). The alleged invention defined thereby is not in fact an invention or combination but is a mere aggregation of old elements.

(b). The patents are not in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which they appertain, or with which it is most nearly connected to make, employ, or use the same, as required by law.

(c). The claims of said patents, and each of them, do not comply with R.S. 4888, 35 USC 33, in that they are vague, indefinite, and ambiguous, and they do not, and none of them does, distinctly claim the part, improvement, or combination, which the applicant

claims is his invention or discovery, but, on the contrary, said claims, and each of them, attempts to patent a function or result.

(d). The claim of said patents are broader than and are not properly based upon, or supported by the disclosure of the application as originally filed in the United States Patent Office on December 31, 1937.

(15):

(e). The effectaive filing date of the application and continuation thereof which resulted in Letters Patent Nos. 2,210,846 and 2,316,832 is limited to the actual filing date thereof in the United States, namely, December 31, 1937, and is not entitled to the filing date of December 8, 1934, in Belgium.

(f). The alleged invention or discovery purportedly described and claimed in said patents involved nothing more than the exercise of mere mechanical skill in view of the state of the art as known at the time of, and long prior to the alleged invention or discovery thereof by the applicant for said patents, said state of art including the prior patents listed in Paragraph 15 hereof, and instead comprises but the mere copying and adaptation of the principals of construction and operation of water and air mixing devices and other apparatus known previously, as is to be expected of anyone skilled in the art.

17. Defendant further alleges that the aerating devices which it sells and which are charged by Plaintiff to infringe Patent Nos. 2,210,846 and 2,316,832 are not an infringement of any of the claims of any of said Letters Patent because they do not embody the structural features disclosed and claimed in said Letters Patent; and further,

(16):

that the claims of said patents are so limited in terms and in light of the prior art and by virtue of limitations

and interpretations necessarily placed upon them during the prosecution of the application therefor in the Patent Office as to render them ineffective in scope to cover any device sold by Defendant, and Plaintiff is estopped by the proceedings in the Patent Office in connection with the prosecution of the applications for said patents to assert that the "Mel-O-Flo Jet Aerators" used or sold by Defendant constitute an infringement upon any of the claims thereof of said patents.

Wherefore, Defendant prays:

1. That judgment and decree be entered denying Plaintiff the relief sought in its complaint.

2. That Letters Patent Nos. 2,210,846 and 2,316,832 be adjudged invalid and unenforceable.

3. That it be adjudged that the Defendant is not infringing and has not infringed any of the claims of said Letters Patent Nos. 2,210,846 or 2,316,832.

4. That the said Complaint be dismissed with costs and attorneys' fees awarded to Defendant.

5. That the Court grant Defendant such other and further relief as appears meet and just.

(17):

COUNTERCLAIM

As a counterclaim herein, Defendant, S. H. Kress & Company, alleges as follows:

1. This is a counterclaim for Declaratory Judgment based on United States Code, Title 28, Section 2201, and jurisdiction of this Court arises under the Patent Laws of the United States, United States Code, Title 28, Section 1338.

2. As to residence and place of business of Plaintiff and Defendant, Defendant hereby adopts by reference the allegations contained in Paragraphs 2 and 3 of this Answer.

3. Plaintiff has charged this Defendant with infringement of United States Letters Patent Nos. 2,210,846 and 2,316,832 by reason of Defendant's sale of "Mel-O-Flo Jet Aerator" aerating devices.

4. Said Letters Patent Nos. 2,210,846 and 2,316,832 in suit, are invalid and void and Defendant has not infringed and is not infringing the same for the reasons alleged in Paragraphs 13 to 17 of Defendant's Answer.

5. An actual controversy exists between Plaintiff and Defendant with respect to said Letters Patent in suit and with respect to Defendant's right to continue to use and sell the device charged by Plaintiff to infringe said Letters Patent and with respect to the validity of the scope of said Letters Patent.

(18):

Wherefore, Defendant prays for Declaratory Judgment that Letters Patent Nos. 2,210,846 and 2,316,832 are invalid and void and that none of the claims of said Letters Patent is infringed by Defendant; that costs and reasonable attorneys' fees be awarded to Defendant; and that the Court grant such other and further relief as appears meet and just.

S. H. Kress & Company
By *Norman Block*

(34):

In the United States District Court

* * (Caption—Civil Action No. 857-G) * *

(Nov. 17, 1954)

MOTION FOR INSPECTION AND COPYING

Now comes Defendant, S. H. Kress & Company, in the above entitled action, and in accordance with Rule 34 of the Rules of Civil Procedure, moves this Court for an order that there be produced by Plaintiff for inspection,

copying or photographing the following documents and things:

1. Each and every device or model demonstrated by Elie P. Aghnides, plaintiff herein, or by his patent attorneys, to representatives of the United States Patent Office, including the Board of Appeals thereof, during the prosecution of the aplication of the two (2) Aghnides' patents in suit,
   (a) as being illustrative of the structures of the British Hasiman Patent No. 7005, and the United States Frederick Patent No. 2,003,184;

(35):

   (b) as being illustrative of the structures of any other prior art patents or prior art devices;
   (c) as being illustrative of the structures disclosed in the application of said two (2) Aghnides' patents in suit;
2. A representative sample of each and every device or model, commercial or otherwise, made by or for said Aghnides in substantial accordance with each of the seven various forms of devices shown in the drawings of the Aghnides patent in suit No. 2,210,846, and of the three forms of devices shown in the drawings of the Aghnides patent in suit No. 2,316,832.
3. A representative sample of each and every device or model made, used or sold by said Aghnides embodying the alleged invention disclosed in said two (2) Aghnides' patents in suit.
4. A representative sample of each and every device or model, commercial or otherwise, made by or for said Aghnides in substantial accordance with the structures and forms shown in the prior art Aghnides patent No. 1,912,113 of May 30, 1933.

(36):

5. Each and every license agreement, and all modifications thereof, entered into between said Aghnides and his licensees in accordance with which said licensees were granted licenses under the two (2) Aghnides' patents in suit.
6. A representative device of each and every type and style of device made, used or sold commercially under said two (2) Aghnides' patents in suit by or for each of the licensees named in the license agreements produced under paragraph 5 hereof.

at the Clerk's Office, Room 601, United States District Court, Southern District of New York, Foley Square, New York, New York, located in the United States District wherein Plaintiff herein resides, at 10:00 A. M. on Monday, December 6, 1954.

• • •

(30):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

ORDER FOR PRODUCTION AND COPYING OF DOCUMENTS

This cause coming on to be heard before the Honorable Johnson J. Hayes, United States District Judge, upon (1) the motion of the defendant served on November 16, and filed on November 17, 1954, to require the plaintiff, Elie P. Aghnides, to produce and to permit the defendant to inspect and to make copies of certain documents, papers and things set forth in the said motion, and upon (2) the motion of the plaintiff served upon the defendant and filed on November 22, 1954, to require the defendant, S. H. Kress & Company, to produce and to permit the plaintiff to inspect and make copies of certain documents, papers,

and things, and it appearing to the Court from representations of counsel for the respective parties that the defendant has agreed to produce the documents, papers, and things set forth in the plaintiff's motion except those which constitute confidential communications between attorney and client, and the plaintiff has agreed to produce the documents, papers, and things, set forth in the defendant's motion except those which are no longer in existence. (31):

IT IS ORDERED that the plaintiff produce at the Clerk's Office, Room 601, United States District Court, Southern District of New York, Foley Square, New York, New York, at 10:00 a.m. on Monday, December 6, 1954, for inspection, copying, or photographing by the defendant all of those documents, papers, and things set forth in the Motion of the defendant served on the plaintiff on November 16, and filed in this cause on November 17, 1954, except those documents, papers and things which are not now in existence, and,

IT IS ORDERED that the defendant produce at the offices of Pennie, Edmonds, Morton, Barrows & Taylor, at 247 Park Avenue, Room 1800, New York, New York, at 10:00 a.m. on Tuesday, December 7, 1954, for inspection, copying or photographing by the plaintiff all of those documents, papers and things set forth in the Motion of the plaintiff served on the defendant and filed in this cause on November 22, 1954, except those documents and papers which constitute a confidential communication between attorney and client.

This the 1 day of December, 1954.

Johnson J. Hayes
Johnson J. Hayes, Judge
United States District Court

(32):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

REPLY TO COUNTERCLAIM

1. Answering paragraphs 1, 2, and 3 of the Counterclaim, plaintiff admits the allegations thereof.

4. Plaintiff denies each and every allegation of paragraph 4 of the Counterclaim.

5. Plaintiff admits that an actual controversy exists between plaintiff and defendant with respect to the validity of the patents in suit and with respect to infringement thereof by defendant.

6. Plaintiff denies that defendant is entitled to any relief as prayed for in the Counterclaim.

Elie P. Aghnides, Plaintiff
Brooks, McLendon, Brim & Holderness

Dec. 6, 1954

(41):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

AMENDMENT TO ANSWER

Now comes S. H. Kress & Company, defendant, and by leave of Court first duly had and obtained, files in the above-entitled cause an Amendment to its Answer heretofore filed, and says:

IN PARAGRAPH 15 OF THE ANSWER

Add to the list of Prior Art listed in Paragraph 15 of the Answer the following:

UNITED STATES LETTERS PATENT

Patent No.	Patentee	Date of Issue
326,221	Hyatt	Sept. 15, 1885
591,830	Ferguson	Oct. 19, 1897
1,195,044	Lockwood	Aug. 15, 1916

PUBLICATION

"A Descriptive and Historical Account of Hydraulic and Other Machines for Raising Water", by Thomas Ewbank. Derby and Jackson, New York, N .Y. (14th Ed., 1857), Publisher.

S. H. Kress & Company
By *Norman Block*
Attorney for the Defendant

(46):

In the United States District Court

(Caption—Civil Action No. 857-G)

MOTION TO ADD NEW PARTY PLAINTIFF

The plaintiff, Elie P. Aghnides, moves the Court for an order allowing Chase Brass & Copper Company, Inc., to appear in the above captioned action as a party plaintiff and to file a complaint therein adopting the complaint of plaintiff, Elie P. Aghnides, because it ought to be a party plaintiff if complete relief is to be accorded for the alleged infringement of the patents involved in said action and as between those already parties, for that Chase Brass & Copper Company, Inc., is the assignee of the said patents, under an assignment from plaintiff, Elie P. Aghnides. Plaintiff, Elie P. Aghnides, further states that Chase Brass

& Copper Company, Inc., can be made a party plaintiff without depriving this Court of the jurisdiction of the parties already before it; and that it is a corporation organized and existing under the laws of the State of Connecticut, and intends to subject itself to the jurisdiction if this Court by filing a complaint in said action.

Thornton H. Brooks
Attorney for Plaintiff,
Elie P. Aghnides

(43):

IN THE UNITED STATES DISTRICT COURT

• • • (Caption—Civil Action No. 857-G) • • •

ORDER ADDING NEW PARTY PLAINTIFF

By consent of the defendant made in open court, the motion of the plaintiff, Elie P. Aghnides, to allow Chase Brass & Copper Company, Inc., to appear and enter into this action as an additional party plaintiff is granted, and it is ordered that it be made an additional party plaintiff and that the title to this action be amended to list it as a party plaintiff, and that Chase Brass & Copper Company, Inc., be allowed to file a complaint herein adopting the complaint and pleadings of the plaintiff, Elie P. Aghnides.

It is further ordered that the defendant have twenty days within which to file answer or other pleadings to said complaint.

This 28th day if January, 1953.

U. S. District Judge
Johnson J. Hayes

(44):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

COMPLAINT OF CHASE BRASS & COPPER COMPANY, INC.

I.

The plaintiff, Chase Brass & Copper Company, Inc., is a corporation organized and existing under the laws of the State of Connecticut, with its principal office at Waterbury, Connecticut.

II.

The defendant is a corporation organized and existing under the laws of the State of New York.

III.

The plaintiff, Chase Brass & Copper Company, Inc., is the assignee of U. S. Letters Patent No. 2,210,846 dated August 6, 1940, and No. 2,316,832 dated April 20, 1943, by virtue of written assignment from the patentee, Elie P. Aghnides, delivered December 8, 1954.

IV.

The plaintiff, Chase Brass & Copper Company, Inc., hereby adopts by reference all the allegations of the complaint and other pleadings of the plaintiff, Elie P. Aghnides, as filed in this action and asks that said complaint and pleadings be taken and considered as its own.

(45):

WHEREFORE, the plaintiff, Chase Brass & Copper Company, Inc., prays that such relief demanded in said adopted complaint of Elie P. Aghnides as plaintiff Chase Brass & Copper Company, Inc., is entitled to, be granted to it.

Ely, Frye & Hamilton
Brooks, McLendon, Brian & Holderness
Attorneys for Plaintiff,
Chase Brass & Copper Company, Inc.

(47):

IN THE UNITED STATES DISTRICT COURT

(Caption—Civil Action No. 857-G)

DEFENDANT'S SECOND ANSWER

Now comes Defendant, S. H. Kress & Company, and in Answer to the Complaint of Chase Brass & Copper Company, Inc., which was filed in this Court on January 28, 1955, pleads as follows:

I. Defendant admits the allegations in Paragraphs I, II, and III of said Complaint.

II. In Answer to Paragraph IV of said Complaint, Defendant hereby adopts by reference all of the allegations and pleadings in Paragraphs 1 to 17 inclusive of its Answer, and in Paragraphs 1 to 5 of its prayer for judgment, heretofore filed in this action on July 6, 1954.

III. In addition to the Prior Art listed in Paragraph 15 of said Answer of July 6, 1954, Defendant further

(48):

alleges the following Prior Art references which now should be added to said Paragraph 15, by amendment:

United States Letters Patent

Patent No.	Patentee	Date of Issue
326,221	Hyatt	Sept. 15, 1885
591,830	Ferguson	Oct. 19, 1897
1,058,330	Page et al	Apr. 8, 1913
1,195,044	Lockwood	Aug. 15, 1916

Foreign Patents

British Patent 19,654	Wright	Oct. 19, 1893
British Patent 12,345	Vielliard	June 1, 1898

Publication

"A Descriptive and Historical Account of Hydraulic and Other Machines for Raising Water . . . etc.", by Thomas Ewbank, Derby and Jackson, New York, New York, (14th Ed. 1857) Publisher—pages 475-481—.

AND AS FURTHER AND AFFIRMATIVE DEFENSES AGAINST THE COMPLAINTS OF THE PLAINTIFFS, ELIE P. AGHNIDES AND CHASE BRASS & COPPER COMPANY, INC., THIS DEFENDANT ALLEGES AS FOLLOWS:

IV. The Plaintiffs, Elie P. Aghnides and Chase Brass & Copper Company, Inc., from January, 1944 and continuing until December, 1954, had conspired with each other (49):

under the cloak of a license agreement or agreements to utilize the aforesaid patents as a means for bringing about the sale of unpatented products, to-wit: faucets, with which the subject matter of said patents may be used, the said license agreements being restricted to the sale of aerators of the patents only with the sale of faucets, except in a very restricted and limited sense, said license agreements being of the kind that permitted large volume sales of aerators, or faucets including aerators, to large manufacturers, and precluded sale of aerators to small manufacturers or users, except by approval of the then licensor, Elie P. Aghnides.

V. That certain license agreements between the Plaintiff, Elie P. Aghnides and his various licensees—namely, Firestone Tire & Rubber Company, Chicago Faucet Company, and Montgomery Ward & Company—to which license agreements the Plaintiff, Chase Brass & Copper Company, Inc., has now succeeded as assignee of the Plaintiff, Elie P. Aghnides, each includes provisions for dividing world markets with respect to the subject matter of the two United States Letters Patent which are the subject matter of this lawsuit, and that the said Plaintiff, Chase Brass & Copper Company, Inc., is at present carrying on its business with the full knowledge that the world market has

been divided, and accepted transfer, from said Plaintiff, Elie P. Aghnides, of the license agreements with said three licensees—"Firestone", "Chicago Faucet", and "Montgomery Ward"—with the full knowledge that it would be benefited therefrom by the limitation and division of world markets, said Plaintiff not being so limited.

(50):

That within six years last past, the said Plaintiffs, Aghnides and Chase, and said licensees herein referred to have operated under the cloak of the aforesaid patents with "tying clauses" preventing the sale of aerators apart from faucets (an unpatented product), and have operated under written agreements for dividing world markets, all in violation of the Anti-Trust Laws of the United States and against public policy, and to the detriment and irreparable injury of the Defendant, S. H. Kress & Company.

VI. That the pattern of conduct on the part of the said Plaintiff, Elie P. Aghnides—and by said Aghnides' assignee, the Plaintiff, Chase Brass & Copper Company, Inc.—by their licensing programs has been such as to prevent free, open competition in aerators, and that said Plaintiffs used and are using said patents to obtain unlawfully benefits from the patents beyond the statutory grant thereof.

That because of such improper use of their patents, in violation of the Anti-Trust Laws, said Plaintiffs, Elie P. Aghnides and Chase Brass & Copper Company, Inc., have rendered said patents unenforceable.

Wherefore, Defendant prays that this Court hold, declare and adjudge that Plaintiffs have violated the Anti-Trust Laws by expanding the statutory grant of said Letters Patent Nos. 2,210,846 and 2,316,832, and that as a result thereof Plaintiffs' patents and their claims based thereon are unenforceable in law or equity.

COUNTERCLAIM

As a Counterclaim herein, Defendant, S. H. Kress & Company pleads as follows:
(51):

VII. Defendant hereby adopts by reference all of the allegations and pleadings in Paragraphs 1 to 5 inclusive of its Counterclaim and the prayer for judgment heretofore filed with said Answer in this action on July 6, 1954.

AND AS AN ADDITIONAL COUNTERCLAIM AGAINST PLAINTIFFS, ELIE P. AGHNIDES, AND CHASE BRASS & COPPER COMPANY, INC., THIS DEFENDANT ALLEGES AS FOLLOWS:

VIII. Defendant hereby adopts by reference all of the allegations and pleadings in Paragraphs IV, V, and VI of this document and hereby pleads same as a cause of action for damages that have been sustained by Defendant, S. H. Kress & Company, as a result of the violations by Plaintiffs of the Anti-Trust Laws of the United States.

Wherefore, Defendant prays this Honorable Court to award an injunction restraining and enjoining the Plaintiffs, Elie P. Aghnides and Chase Brass & Copper Company, Inc., their officers, agents, attorneys, servants, employees, and all others acting by and under its direction and authority in any way, from violating the Anti-Trust Laws under the cloak of patent licensing under Letters Patent Nos. 2,210,846 and 2,316,832; and that this Honorable Court find that Plaintiffs, Aghnides and Chase, in the conduct of their business, have, in connection with said Letters Patent Nos. 2,210,846 and 2,316,832 violated the Anti-Trust Laws and injured the Defendant herein; and that an accounting be awarded to Defendant to determine the damages suffered by Defendant as a result of said Plaintiffs' Anti-Trust violations, and that said dam-

ages so determined be trebled in accordance with the Anti-
(52):
Trust Laws; and that said Plaintiffs, Aghnides and Chase, be required to pay the costs of this suit, together with reasonable attorneys' fees because of the wrongful acts done by said Plaintiffs.

S. H. Kress & Company
Norman Block
Attorney for Defendant

(53):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

REPLY TO COUNTERCLAIMS ANNEXED TO DEFENDANT'S SECOND ANSWER.

1. In reply to the counterclaim, paragraph VII, plaintiffs adopt by reference all of the pleadings of the Reply to Counterclaim of Aghnides, filed December 8, 1954.

2. In reply to the additional counterclaim, paragraph VIII, plaintiffs deny each and every allegation of paragraphs IV, V and VI of defendant's second answer, deny that defendant has been damaged by any acts of plaintiffs or either of them, and deny that plaintiffs have in any way violated the Anti-Trust Laws of the United States.

3. Plaintiffs further deny that defendant is entitled to any relief as prayed for in said counterclaim, or any of them.

Elie P. Aghnides and
Chase Brass & Copper Company, Inc.
By Thornton H. Brooks,
Attorney for Plaintiffs.

(55):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

DEFENDANT'S SECOND AMENDMENT TO ANSWER.

Now comes Defendant, S. H. Kress & Company, and by leave of Court first duly had and obtained, amends Paragraph 15 of the Answer heretofore filed on July 6, 1954 to include the following:

AS FURTHER AND AFFIRMATIVE DEFENSES RE UNITED STATES PATENT 2,316,832

(15a.) That patent 2,316,832 and each of the claims thereof are invalid and of no effect in law on the grounds that the alleged inventions set forth and claimed therein, or all substantial and material parts thereof.

(i.) were known, or used, or sold by Chicago Faucet Company of Chicago, Illinois, in this country before the invention thereof by Aghnides,

(ii.) were in public use in this country more than two years prior to the date of application for patent which resulted in said patent 2,316,832,

(iii.) were on sale in this country more than two years prior to the date of application for patent which

(56):

resulted in said patent 2,316,832,

and (iv.) before Aghnides' invention thereof, the invention was made in this country by another who had not abandoned, suppressed, or concealed it.

S. H. Kress & Company
By Norman Block
Attorney for Defendant

(57a):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

PLAINTIFFS' PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW

Plaintiffs submit the attached proposed findings of fact and conclusions of law.

(57):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

FINDINGS OF FACT

I

This is an action for infringement of two patents, No. 2,210,846, issued August 6, 1940, and No. 2,316,832, issued April 20, 1944, to the plaintiff Elie P. Aghnides.

II

Plaintiff Aghnides is a citizen and resident of New York, N.Y., and is the patentee of both patents in suit. Plaintiff Chase Brass & Copper Company, Inc., is a corporation organized and existing under the laws of the State of New York with its principal office at Waterbury, Connecticut; and is, by written assignment from plaintiff Aghnides delivered December 8, 1954, the assignee, subject to certain reservations of interest in Aghnides, of said patents Nos. 2,210,846 and 2,316,832.

(58):

III

Chase Brass & Copper Company, Inc., was added as an additional party plaintiff by order of the Court on motion of plaintiff Aghnides at the first hearing of this case on January 26, 1955, and said Chase Brass & Copper Company, Inc., thereupon filed its complaint adopting all of the

allegations of the original complaint and other pleadings of plaintiff Aghnides theretofore filed in this action, and the trial was adjourned January 28, 1955 to permit formulation of issues and preparation for trial thereon.

IV

The defendant, S. H. Kress & Company, is a New York corporation, domesticated in North Carolina December 31, 1938, and having a regular and established place of business at Greensboro, North Carolina.

V

The Court has jurisdiction of the parties and the subject matter of this suit.

VI

After Chase Brass & Copper Company, Inc., was added as a party plaintiff, defendant filed, on February 11, 1955, a second answer and counterclaim charging plaintiffs Aghnides and Chase Brass with improper use of their patents, in violation of the Anti-Trust Laws and interposed an affirmative claim for damages based thereon. These allegations were denied by plaintiffs, and the issues thereon (59):

were to be tried along with the issues of validity and infringement of the patents in suit when the case resumed hearing. In the interval between hearings, plaintiffs carried on extensive discovery proceedings including the taking of depositions in preparation to meet the charges of mis-use of patents and violation of the Anti-Trust Laws. When the case resumed hearing on October 10, 1955, defendant stated in open court that it had abandoned its defense of mis-use of patents and violation of the Anti-Trust Laws and its counterclaim based on them.

VII

Aghnides Patent No. 2,210,846 is for a water aerator adapted to be attached to the outlet end of a faucet or tap

and consists of a relatively large open chamber into the upper end of which the water and air separately enter and from which his soft, splashless, thorough aerated, bubbly streams. The water enters through an aperture or apertures as unconfined, fine jets having high velocity. The chamber is provided with independent air ports through which air from the atmosphere freely passes into the chamber so as to surround the water jets and be available for mixing with the water as air already in the chamber is mixed and is discharged with the water at the outlet. The high velocity naked jets pass through this body of air and strike against resistance which is shown in several of the figures of the patent drawing to be a screen or superposed screens or a combination of shoulders and a screen located at the outlet end of the chamber. This resistance is pro-
(60):
portioned to the velocity of the jets so that it finely breaks up the water, mixes the broken-up water with air, and thereafter unites the broken-up water so as to form a coherent stream with the air imprisoned in the water in the form of small bubbles disseminated throughout. The water issues from the outlet end of the chamber as a soft, splashless, coherent, white stream or column of water filled with a multitude of fine air bubbles.

VIII

Patent No. 2,316,832 is for an improvement upon the basic conception of Patent No. 2,210,846, and is directed to means for compensating for variations in pressure in the stream of water entering the aerator. This improvement consists in either placing a second perforated diaphragm upstream from the diaphragm of the first patent, or in providing a restricted orifice upstream from said first diaphragm, or in providing both the second diaphragm and the restricted orifice upstream from said first diaphragm.

This results in a more perfect, improved stream of soft, splashless, coherent water under varying conditions of pressure.

IX

Patent No. 2,210,846 is a basic patent covering devices having the structure or its equivalent and performing the functions and purposes described in Finding No. VII hereof. The improvement of Patent No. 2,316,832 is not essential for achieving the purposes and objects of the basic invention, but is a valuable improvement which may be used to compensate for variations in pressure.

(61):

X

The Aghnides' invention was an innovation in the field of aeration of water and for the first time gave the homeowner a device to be attached to his water faucet which would produce at the point of use a coherent, soft, splashless stream of thoroughly aerated water containing millions of tiny air bubbles. There was no prior device giving such a result. It has gone into widespread use and today is an item of standard equipment on faucets of practically every faucet manufacturer, large and small. By the end of 1954 over 21,000,000 had been sold.

XI

Patents Nos. 2,210,846 and 2,316,832 have been recognized by substantial concerns in this country who have taken licenses under the patents. One of these licensees was Chase Brass & Copper Company, Inc., which has recently acquired ownership of the patents. Other manufacturers presently operating under licenses under the patents are Firestone Tire and Rubber Company of Akron, Ohio, and the Chicago Faucet Company of Chicago, Illinois. Licenses have been granted under corresponding patents in European countries.

XII

The largest producer under the patents in this country is Chase Brass & Copper Company, Inc., which concern, prior to acquiring its license in 1944, made an extensive investigation of the validity of the patents in suit, and also made unsuccessful attempts to achieve the results of the invention by other means.
(62):

XIII

The basic invention of Patent No. 2,210,846 was disclosed in applicant's Belgian Patent 406,702 filed in Belgium December 8, 1934. The first application for patent in the United States was filed December 4, 1935 as Serial No. 52,923. During the pendency of the said application Serial No. 52,923, the application on which the patent in suit issued was filed December 31, 1937, Serial No. 182,884 as a continuation of application Serial No. 52,923, whereupon application No. 52,923 was abandoned.

XIV

Application for Patent No. 2,210,846 was several times rejected by the Examiner on references, primarily the British patent of Felten, No. 6012 of 1909 (Plaintiffs' Exhibit 24). Plaintiff Aghnides came to this country in 1939 and interviewed the Examiner with respect to the rejection of his application on the Felten patent and made comparative demonstrations of devices embodying his invention with a device which he has made in conformity with the Felten patent. The Examiner withdrew the Felten patent as a reference but finally rejected the claims of the application on a British patent of Haisman, 7005 of 1913 (Plaintiffs' Exhibit 76), and United States patent to Friedrich, 2,003,184. Appeal was taken to the Board of Appeals of the Patent Office at which Aghnides appeared and demonstrated aerators embodying the invention of Patent No. 2,210,846 and reproductions which he had made of the

Haisman and Friedrich patents. Following the hearing and
(63):
the demonstrations the Board of Appeals allowed the claims of Patent No. 2,210,846 (File Wrapper of Patent 2,210,846, Plaintiffs' Exhibit 16.)

XV

Application for Patent No. 2,316,832 was likewise rejected by the Examiner, among the references cited being the Felten, Haisman and Friedrich patents aforesaid. These patents were later withdrawn as references, and the Examiner finally rejected the claims on Aghnides' own patent No. 2,210,846 which had issued in the meantime. Appeal was taken to the Board of Appeals, and after a hearing at which Aghnides demonstrated devices embodying the invention of his Patent No. 2,316,832 the claims of the patent were allowed. (File Wrapper of Patent No. 2,316,832, Plaintiffs' Exhibit 17.)

XVI

Defendant, prior to the filing of the Complaint herein, sold aerators at Greensboro, North Carolina, known as "Mel-O-Flo" aerators, which are charged to infringe both patents in suit, manufactured by Melard Manufacturing Corporation located in New York City. Two of these aerators were purchased by a representative of plaintiffs from defendant's store in Greensboro on March 30, 1954, and are in evidence as plaintiffs' exhibits 18 and 19.
(64):

XVII

Plaintiffs exhibited to the Court aerators made by manufacturers licensed under the patents, namely, a "Spring-Flo" aerator (Pl. Ex. 29) made by Chase Brass & Copper Company, Inc., a "Soft-Flo" aerator (Pl. Ex. 30) made by Chicago Faucet Company, and a "Velva-Flo" aerator (Pl. Ex. 31) made by Firestone Tire and Rubber Company.

Also exhibited were models of aerators made according to the modification shown in Fig. 4 (Pl. Ex. 28) and the modification shown in Fig. 6 (Pl. Ex. 32) of Patent No. 2,210,846.

XVIII

The Aghnides' aerators referred to in Finding XVII and defendant's Mel-O-Flo aerator (Pl. Ex. 18) were taken apart and examined by the Court, and each of these aerators is found to embody the structural features of Patent No. 2,210,846 as set forth in Finding VII hereof. Correspondence of the structural elements of the defendant's Mel-O-Flo aerator to those of Aghnides is shown in plaintiffs' Exhibit 33 which applies claims 1 and 4 of this patent to the Mel-O-Flo aerator.

XIX

A demonstrator tank equipped with faucets for the attachment of aerators, with a pump for circulating water from the tank through the faucets, and with a pressure gauge and a vacuum gauge was used to test the mode of operation and results of the alleged infringing Mel-O-Flo aerator and the Aghnides' aerators embodying the struc-
(65):
tures claimed in the patents. The aerators referred to in Finding XVII and defendant's Mel-O-Flo aerator (Pl. Ex. 18) and demonstration elements thereof were connected to faucets of the tank and the tank operated in the presence of the Court.

XX

The Mel-O-Flo aerator gave a coherent, white stream thoroughly filled with a multitude of fine air bubbles disseminated throughout and splashless and soft to the touch, the same result observed to be characteristic of Aghnides' aerators. The Court observed the mode of operation and the results attained by all of these devices to be substantially identical.

XXI

Various models of the Aghnides' device, the Mel-O-Flo device, a prior art vacuum pump device, Felten and Aghnides own prior vacuum pump were tested upside down so that the stream of water emitted from the faucet in fountain fashion. These tests afforded means of determining the relative volumes of air added by each of the devices tested. The results are set forth in Plaintiffs' Exhibit 28 and are summarized as follows: (66):

		Cubic Inches of Air Added to Each Cubic Inch of Water
Transparent Felten	(Pl. Ex. 44)	.5
Metal Felten	(Pl. Ex. 56)	.7
Aghnides Vac. Pump	(Pl. Ex. 47)	.1
Spring-Flo	(Pl. Ex. 29)	6.0
Aghnides Fig. 4	(Pl. Ex. 28)	4.3
Mel-O-Flo	(Pl. Ex. 58)	5.1

The results show the Aghnides aerator and the Mel-O-Flo aerator to be comparable in result and different from the prior art devices.

XXII

Defendant's Mel-O-Flo aerator is an embodiment of Aghnides' invention and utilizes substantially the same elements and the same mode of operation to accomplish the same result.

XXIII

Defendant's Mel-O-Flo aerator (Pl. Ex. 18) has the second upstream diaphragm of Patent No. 2,316,832, and when used with the adaptor with which it is sold embodies both the second upstream diaphragm and the restricted upstream orifice of Patent No. 2,316,832.

XXIV

Two charts (P. Exs. 35 and 37) applying claims 2 and 4 of Aghnides 2,316,832 to the structural elements of the Mel-O-Flo aerator show the correspondence of those structures to the elements of the Aghnides claim.
(67):

XXV

The one upstream diaphragm in the Mel-O-Flo aerator is formed by the toothed disk and the other upstream diaphragm is formed below the toothed disk by the bulb or onion and the surrounding ring providing an annular space therebetween through which water is forced into the chamber below with substantial velocity. Demonstration showed that the space between the two Mel-O-Flo diaphragms is full of water but that the individual streamlets do not lose their identity. Demonstration further showed that when the one or the other of the two Mel-O-Flo diaphragms is used alone, the characteristic Aghnides' bubbly stream is still produced by the device. Defendant's Mel-O-Flo aerator is an embodiment of Aghnides' invention in Patent No. 2,316,832 and the same or equivalent elements accomplish the same result in the same way.

XXVI

Defendant did not produce any evidence that any device embodying the Aghnides combination of elements operating in accordance with his mode of operation on giving his results existed prior to Aghnides' invention.

XXVII

Seven prior United States patents, seven prior British patents and a prior publication were cited against patent numbers 2,210,846 and 2,316,832. The following were relied on at the trial:

(a) *Hyatt Patent No.* 326,221, *issued* 1885. This is an aerating system for purifying the water supply of a city (68):
before it enters the city mains and the air is intended to escape from the water long before it reaches the home owner. There is no idea of supplying the home-owner with a soft, splashless, aerated stream of water. No device is indicated which could be used by the homeowner to secure aeration at the faucet itself, the point of use.

(b) *Ferguson Patent No.* 591,830, *issued* 1897. This is a complicated mechanism for the production of effervescent or "Nauheim" baths by injecting a salt solution charged with CO2 gas below the surface of the bath water in a bath tub. The gas and salt solution both enter under pressure and the structure and mode of operation are different than Aghnides. There is nothing in this disclosure suggestive of the Aghnides' aerator for the homeowner to attach to his faucet to get a soft, splashless, coherent jet of bubble-filled water.

(c) *Claflin Patent No.* 881,548, *issued* 1908. This is an adjunct to a vacuum steam heating system to maintain an extremely high vacuum of 29". It is not designed as an aerator nor intended to operate as an aerator but rather the design is typical of vacuum pumps. The device is totally unsuited for drinking water because even the small amount of air evacuated from the steam system would pollute the water and make it taste of steam. The production of a bubbly soft, splashless stream characteristic of Aghnides is not possible for the device doesn't pass sufficient air under any circumstances since it operates under vacuum.
(69):

(d) *Lockwood Patent No.* 1,195,044, *issued* 1916. This apparatus is a massive commercial purification plant for

saccharine juices which are then stored in a large tank. It does not propose or suggest any device of use to the homeowner. It is not designed to be attached to a faucet and does not produce a soft, splashless stream of aerated water from a faucet.

(e) *Aghnides Patent No.* 1,912,113 *issued* 1933 (*and Aghnides British Patent No.* 375,066) This is Aghnides' own patent. It is a vacuum pump not an aerator. Its operation was demonstrated to the Court. It produces a high vacuum of 25 inches and adds only .1 of a cubic inch of air to 1 cubic inch of water whereas Aghnides' aerator produces substantially no vacuum and adds 6 cubic inches of air—60 times as much. It does not operate on the same principle as the Aghnides' aerator but on the principle of a vacuum pump with a flooded chamber which prevents the back-flow of air. The Aghnides' vacuum pump was adapted and intended to be attached to a closed container for extracting a limited amount of air therefrom.

(f) *Felten British Patent No.* 6012 *of* 1909 (*and Fuss Patent No.* 1,090,044). This device is also designed to secure a vacuum. Models thereof were demonstrated to the Court by plaintiff from which Felten's construction, mode of operation and results were made evident. Felten's device does not produce the fully aerated, soft, stream characteristic of Aghnides and does not operate on the same principle or use the same combination of elements. It produces (70):

a high vacuum of 25" of mercury as in the case of Aghnides' own vacuum pump but in contrast with 1" or less produced by Aghnides' aerator and by defendant's "Mel-O-Flo" aerator. Felten is so constructed that the energy of the water is spent in creating a vacuum and not in securing aeration. Demonstration showed that it adds less than 5/10 of a cubic inch of air to 1 cubic inch of water

whereas Aghnides' aerator adds 6 cubic inches or 12 times as much.

Not only was it demonstrated that Felten's result is different but that he secures his result by different elements and by a different mode of operation. The patent states that the result is secured by means of a "conically widening chamber e, the widening of which produces in a well known manner the suction of the gas from the perforation d owing to the flow of the liquid from the perforation c into the widened chamber e". (Felten Patent, p. 1, line 28). This has no counterpart in Aghnides. Felten, to secure his result, must keep the chamber flooded—the exact opposite of Aghnides. This was demonstrated by a transparent model (Exh. 44) which made it possible to see that the widening chamber was at all times flooded and that there were no individual jets striking Felten's baskets. The flooding of the chamber was also demonstrated by drilling a hole into a widening chamber whereupon water squirted out and, when the air through the inlet provided by Felten above the chamber was cut off no air entered any place and the device became inoperative even as a vacuum pump. Felten's necessity for flooding was also demonstrated by eliminating the flooding (by removing the outlet baskets) under which circumstances the device produced a mere (71):

jet of water with neither vacuum nor aeration. This is a fundamentally different mode of operation than Aghnides as could be seen from the demonstration of an Aghnides' aerator with the sides cut out (P. Exh. 39). The chamber in Aghnides is not a widening one as in Felten and was not flooded but on the contrary contained only the naked water jets in free air striking his resistance screens.

The fundamental nature of the difference between the Felten device and the Aghnides' aerator was also visually

demonstrated to this Court by providing a Felten device (P. Exh. 42) with greatly increased resistance below his baskets—in the amount of 21 screens! The device none the less created substantially the same amount of vacuum as it did without the screens, showing that the intended function of the device was not changed even by a great change in the amount of resistance. On the other hand, when the resistance of an Aghnides' aerator (P. Exh. 42) was increased by adding only three screens its proper proportioning was destroyed, the device flooded and it became useless for its intended purpose. It was also demonstrated that Felten's baskets are not essential to his operation and are not elements corresponding to Aghnides' essential resistance screens or shoulders; when Felten's baskets were removed, his device would still operate with a flooded chamber and produce his high vacuum.

(g) *Battersby British Patent No.* 323,242 *of* 1929. This patent was demonstrated at the trial to produce a result quite different from Aghnides. The demonstration showed that Battersby had a harsh, splashing stream which (72):

was even harsher and more splashy than would be secured directly from the faucet. It further showed that the water in the stream was not aerated with imprisoned air bubbles as in Aghnides, but rather, that the water and the air emerged side by side and that the so-called "whitish" color was no different than the whitish color of an ordinary stream of water emerging from a simple water faucet. It further could be observed that Battersby's stream was not a coherent stream as produced by Aghnides but on the contrary an incoherent, divergent stream. Battersby intended to secure a kind of aeration, but not aeration in any sense like Aghnides. Battersby created his aeration by "violent agitation set up in his receptacle" (Battersby

Patent, p. 3, col. 2, line 104). Battersby did not secure and did not want a soft, splashless stream of water filled with air bubbles as created by Aghnides.

(h) *Solomon British Patent No.* 405,316 *issued* 1934. Solomon is a device operating on the same principle as Battersby. It was demonstrated to produce a violent, splashing, divergent stream without air bubbles which secured its kind of aeration by agitation in the glass—a wholly different kind of stream than Aghnides. Battersby and Solomon "mix" air and water only in the sense that air and water are mixed when a stream breaks up in the air with some air here, some water there, as both rush along together. There is no provision of means by which the stream is made coherent and the air is imprisoned in the water in the form of millions of tiny bubbles as is charac-

(73):

teristic of Aghnides. The difference between the kind of mixing secured by the devices of Solomon and Battersby on the one hand, and Aghnides on the other, is similar to the mixture of air and rubber which is present in a brush with rubber bristles on the one hand and the mixture of air and rubber which is present in a foam-rubber sponge on the other hand. In both it can be said there is a mixing of rubber and air but this doesn't make them anything alike.

(i) *Vielliard British Patent No.* 12,345 *of* 1898 *and Purser British Patent No.* 136,663 *of* 1919. Defendant asserted that it would be obvious to create the Aghnides' aerator by combining conventional anti-splash devices such as known in Purser or Vielliard with the structure of Battersby or Solomon. This has not been proved by defendant.

Purser and Vielliard in themselves have nothing to do with aeration and neither one of them has any provision for the admission of air. They are both very old and well-

known and relate to the type of anti-splash device in common use for years. The failure of the art to make the combination is convincing evidence it was not obvious.

To add an anti-splash device such as Purser and Vielliard would change the fundamental operation of Battersby and Solomon who secure their kind of aeration by producing a harsh, divergent, splashy stream. It was made clear by actual demonstration at the trial that an ordinary splash-preventer such as proposed by Purser or Vielliard might be quite adequate for preventing splashing from an ordi-(74):

nary water faucet and yet have no effect whatever in preventing the turbulence of Battersby or Solomon even if it were attempted. The Aghnides' invention was not obvious to the ordinary man skilled in the art in view of Purser and Vielliard.

(j) *Haisman British Patent No.* 7005 *of* 1913. This patent was not relied on by defendant. It was introduced by plaintiffs. It was cited by the Examiner in the Patent Office and the Board of Appeals allowed the Aghnides patent over it as a reference. Its structure is closer to Aghnides than either Solomon or Battersby inasmuch as it does have a screen at the outlet which Solomon and Battersby do not have.

It was demonstrated at the trial that none the less Haisman (as was true in Solomon and Battersby) produced a harsh, divergent spray and did not give the soft, splashless, thoroughly aerated stream characteristic of Aghnides' invention.

XXVIII

None of the prior art patents discloses the Aghnides' invention of his basic patent. Defendant has not proved that it was within the ordinary skill of the art to create the Aghnides' aerator either by modifying or reconstructing

any of these prior patents or otherwise. The Aghnides' aerator was not anticipated and was a valuable innovation requiring invention beyond the ordinary skill of the art. (75):

XXIX

As to Aghnides 2,316,832, defendant relied on the form of Solomon with the drip-prevention feature (Figs. 7 and 8). A model incorporating this feature was demonstrated, and it was made clear that the aperture forming a part of this drip-prevention feature produced no effect whatever on the stream which issued from Solomon and hence was not the same upper diaphragm or restricted orifice of the Aghnides improvement patent.

XXX

The invention of this second patent did not occur to Aghnides until about two years after the invention of his basic patent, and it required invention beyond the skill of the art at that time, as found by the Board of Appeals of the Patent Office.

XXXI

Defendant has not proved an anticipation of this patent 2,316,832 or that it was within the ordinary skill of the art to create the improved combination of this patent. (76):

XXXII

On November 21, 1936 Aghnides had executed a drawing of his conception of an aerating device embodying a restricted orifice as shown in the second Aghnides patent.

XXXIII

Later, during 1937 in the course of negotiations for a license agreement with Chicago Faucet Company to manufacture aerators under the Aghnides inventions and also subsequent to the execution of that license agreement, during the course of the development of a marketable aer-

ator by that Company, Aghnides disclosed to Chicago Faucet Company the use of a restricted orifice in the aerating device.

XXXIV

Aghnides originally conceived the idea of the use of a restricted orifice in 1936 before the adaptation of such an orifice for use in water aerator device by the Chicago Faucet Company and was the first and original inventor thereof.

XXXV

The application for patent No. 2,316,832 to Aghnides embodying a restricted orifice and second upstream diaphragm was filed in the United States Patent Office on April 5, 1940.
(77):

XXXVI

On January 31, 1938, the Chicago Faucet Company had executed a drawing of the aerator proposed to be made by it which showed the restricted orifice of the Aghnides patent.

XXXVII

The drawing of the proposed aerator also showed a wire mesh screen upstream of the diaphragm in the aerator. This wire mesh screen was not the second upstream diaphragm of the Aghnides patent but was a strainer device which had always been used by the Chicago Faucet Company at the outlet end of its faucets and did not cooperate in any manner with the aerating device.

XXXVIII

The aerating device to be manufactured by Chicago Faucet Company consisted of six parts *viz.* an aerator body, an adapter for connection to a faucet, two wire mesh screens, a gasket and a perforated diaphragm.

XXXIX

All the parts, except the body and the adapter which were to be machined by Chicago Faucet Company itself, were purchased in or about February, 1938.

XL

There is no evidence when the aerator body itself or the adapter were made or machined by the Chicago Faucet (78):
Company nor when aerators were completely assembled by that Company.

XLI

Under the license agreement of December 7, 1937 with Aghnides, Chicago Faucet Company was to obtain his approval of the aerator finally manufactured for the market.

XLII

During March, 1938 an advertisement illustrating the model aerator offered for sale by the Chicago Faucet Company appeared in a trade magazine entitled DOMESTIC ENGINEERING.

XLIII

In letters dated December 28, 1937, January 26, 1938, March 14, 1938, and April 30, 1938, Aghnides continuously requested Chicago Faucet Company to send him a sample of the device they intended manufacturing.

XLIV

It was not until April 14, 1938 that such a sample was sent to Aghnides.

XLV

The sales records of the Chicago Faucet Company show, and defendant concedes, that the first sale of aerators by that company embodying a restricted orifice was not made (79):
until May, 1938.

XLVI

The evidence does not clearly and convincingly establish that the Chicago Faucet Company actually had on hand and assembled any aerators embodying the restricted orifice of the second Aghnides patent at the time of the appearance of the advertisement in DOMESTIC ENGINEERING, March, 1938.

XLVII

The evidence establishes, on the contrary, that no such aerator was assembled until at least April 14, 1938, the date a sample was sent to Aghnides and that there was no sale of such aerators until May, 1938, both times being less than two years prior to the filing of the application, on April 5, 1940, for patent No. 2,316,832.

XLVIII

The aerator manufactured by the Chicago Faucet Company was not on sale or sold prior to two years before the filing date of the application for U. S. Patent No. 2,316,832.

XLIX

Melard Manufacturing Corporation of New York, New York, is the manufacturer of the "Mel-O-Flo" aerator devices sold by the defendant, S. H. Kress & Company, and charged to infringe the patents in suit. The complaint, (80):

filed in Greensboro, North Carolina on May 13, 1954, was sent immediately by the manager of the Kress Greensboro store to the legal department of S. H. Kress & Company in New York. Kress wrote to Melard on May 20, 1954 (Pl. Ex. 4) enclosing the summons and complaint, and stating that S. H. Kress & Company was looking to Melard to take over the defense of the case and save them harmless from any and all loss, cost, damage and expense which might arise therefrom. Melard replied to the letter the next day

(Pl. Ex. 5), advising that they had forwarded the summons and complaint to their attorneys.

L

On July 6, 1954, without consulting the Kress Company, the answer to the complaint was filed by Bair, Freeman & Molinare, who now are and for several years prior to July 6, 1954, had been patent counsel for Melard Manufacturing Corporation. Plaintiff filed interrogatories on or about October 7, 1954, to be answered by Kress, and on or about October 19, 1954, a representative of Bair, Freeman & Molinare called upon Kress for the purpose of drafting answers to the interrogatories. This was the first contact between Kress and Bair, Freeman & Molinare, and the first knowledge that Kress had of the filing of the answer by that firm. Bair, Freeman & Molinare had never acted as counsel for S. H. Kress & Company before. Following that meeting, Melard wrote Kress a letter of indemnity dated November 2, 1954, (Pl. Ex. 2) stating that Melard was indemnifying Kress against all claims arising from (61):

charges of patent infringement as a result of Kress' sale of Mel-O-Flo aerators. This letter of indemnity was accepted by Kress as being in full compliance with Kress' letter of May 20, 1954, asking Melard to take over the defense of this case.

LI

At the trial of this action, the defense was conducted by Bair, Freeman & Molinare. Mr. Freeman stated in open Court that it was being paid for by Melard.

LII

Melard Manufacturing Corporation has defended the action in the name of S. H. Kress & Company and the control of the defense by Melard Manufacturing Corporation has been exercised to protect its own rights in the manufacture of Mel-O-Flo aerators.

CONCLUSIONS OF LAW

I

The Court has jurisdiction over the subject matter of this action and the parties thereto.

II

The Aghnides Patent No. 2,210,846 is good and valid in law.

III

The Aghnides Patent No. 2,316,832 is good and valid in
(82):
law.

IV

The plaintiff, Aghnides, held legal title to and was the owner of said patents at the commencement of this action and up until December 8, 1954.

The plaintiff, Chase Brass & Copper Co., Inc., now has legal title to said patents.

V

The defendant, S. H. Kress & Company, has infringed claims 1 to 4 inclusive of patent 2,210,846 and all claims of patent 2,316,832 by the sale within this District prior to the filing of the Complaint herein, of "Mel-O-Flo" aerators manufactured by Melard Manufacturing Corporation of New York, New York.

VI

The determinations of validity of the patents in suit and infringement thereof are effective and binding upon the defendant, S. H. Kress & Company, and upon the manufacturer, Melard Manufacturing Corporation.

VII

Judgment may be entered awarding plaintiffs damages and costs and ordering an accounting to ascertain and determine the amount of damages.
(83):

VIII

That a permanent injunction shall issue under the seal of this Court directed to the defendant, S. H. Kress & Company, and to Melard Manufacturing Corporation, and to each of them, enjoining each of them and their officers, agents, representatives, employees and attorneys, and all those in privity and participation with them, and each of them, from infringing said Patents Nos. 2,210,846 and 2,316,832, or either of them, during the life of said patents, respectively.

Johnson J. Hayes
United States District Judge

(84):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

DEFENDANT'S FINDINGS OF FACT AND CONCLUSIONS OF LAW

Findings of Fact

1. The Plaintiff, Elie P. Aghnides, is an individual residing in New York, New York and was, until December 8, 1954, owner of United States Patents Nos. 2,210,846 and 2,316,832, the patents here in suit. The Plaintiff, Chase Brass & Copper Co., Inc. is a corporation of the State of Connecticut, having its principal office at Waterbury, Connecticut, and has been, since December 8, 1954, the owner of said patents in suit.

2. S. H. Kress & Company is a New York corporation which is admitted to do business in North Carolina, and has a regular and established place of business at Greensboro, North Carolina. Kress has at all times during the pendency of this suit had control thereof.

3. The Defendant, S. H. Kress & Company, is charged with infringement of Claims 1-4, inclusive, of Patent No.

2,210,846, and of all the Claims, Nos. 1-4, inclusive, of Patent No. 2,316,832, by reason of its sale of aerating devices sold under the name of "Mel-O-Flo Jet Aerator" and exemplified by Plaintiff's Exhibit 18.

(85):

4. The Aghnides patent in suit No. 2,210,846 is entitled "Fluid Mixing Device". In each of the seven forms of devices shown in the patent, there is provided:

(a) a casing which defines a mixing chamber;

(b) a jet forming means at the upper end of the mixing chamber for forming at least one jet of liquid entering said mixing chamber;

(c) fluid passageways leading into the mixing chamber, and the jet of liquid being operative to suck fluid into the mixing chamber; and

(d) at least one resistance screen in the path of the jet of liquid operating to effect mixing of the liquid and fluid prior to issuance of the mixture from the lower end of the device.

(86):

5. The prior art patents—Felten (British) 6012 of 1909, Battersby (British) 323,242, Solomon (British) 405,316, Hyatt (U.S.) 326,221, Ferguson (U.S.) 591,830, Claflin (U.S.) 881,548, Lockwood (U.S.) 1,195,044 and Aghnides (U.S.) 1,912,113—disclose various forms of fluid mixing devices. In each and all of the various forms of fluid mixing devices in said prior art patents, there is provided:

(a) a casing which defines a mixing chamber;

(b) a jet forming means at the upper end of the mixing chamber for forming at least one jet of liquid entering said mixing chamber;

(c) fluid passageways leading into the mixing chamber, and the jet of liquid is operative to suck fluid into the mixing chamber; and

(d) means in the path of the jet of liquid which operates to effect mixing of the liquid and fluid prior to issuance of the mixture from the lower end of the device.

The prior art patents of Felten and Hyatt use perforated plates, or resistance screens as the means for effecting mixing of the liquid and fluid. (See Findings of Fact Nos. 6 and 8 below).

The prior art patents of Solomon, Battersby, and Aghnides (1,912,113) use solid members, against which the jets of liquid are directed, as the means for effecting mixing of the liquid and fluid. (See Findings of Fact Nos. 11, 15 and 18 below).

(87)

6. Prior art Felten British patent No. 6012 of 1909 shows a device for mixing water and ozone-containing-air. The Felten device includes a casing defining a mixing chamber and having jet forming means at the upper end of said mixing chamber for forming one jet of water entering said mixing chamber. A gas passageway is provided leading into the mixing chamber and the jet of water is operative to suck ozone-containing-air into the mixing chamber. A plurality of perforated plates is provided in the path of the jet of water for effecting mixing of the water and ozone-containing-air prior to the issuance of the mixture from the lower end of the device.

7. The device of the British Felten patent No. 6012 is also shown in United States patent No. 1,090,044 to Fuss. Figure 8 of the Fuss patent shows the water system of a dwelling or building having faucets equipped with the Felten type mixer at the ends thereof. Fuss expressly discloses using the Felten type mixer on the faucets of the water system of a building, and in domestic or household water systems in general.

(88):

8. The prior art patent of Hyatt (U.S.) 326,221 of 1885 is entitled "Art Of Purifying Water". The specification states that the apparatus is one "whereby air may be intimately combined with the water". In Figure 5 of Hyatt there is disclosed a casing defining a mixing chamber and having a jet forming means at the upper end of the mixing chamber through which a single jet of water enters. An air inlet opening is provided in the side of the casing through which air is sucked into the mixing chamber by the movement of the jet of water therethrough. There is provided a plurality of screens, specifically five in number, in the path of the water for effecting a mixing of the water and air so as to aerate the water. Although Figure 5 also shows baffles in the casing disposed below the screens, the specification states that the screens alone may be used if desired.

9. Hyatt discloses in his patent a number of devices (including a bed of gravel or stone, screens, and deflecting plates) either singly, or in combinations of two or three of such devices, to effect mixing of water and air. Hyatt thus discloses "proportioning" by selective use of one, two or three resistances to effect the desired result of obtaining an intimate combining of water and air.

(89):

10. Hyatt shows the use of his aerating structure in a system for purifying water, and the aerated water of Figure 5 is taken from the aerating apparatus into a filtering apparatus. Aghnides in his Belgian patent, Plaintiff's Exhibit 13, and in his abandoned United States application, Serial No. 52,923, from which patent 2,210,846 stemmed, both disclose the use of Aghnides' aerator in a system wherein aerated water is taken from Aghnides' device, after the device has mixed the water and air, and is led into

a water softening apparatus before being discharged for ultimate use. In Hyatt, water and air, after being mixed passes into a filterer—and that is structure wise no different than in Aghnides, where water and air, after being mixed, passes into a softener before being discharged for ultimate use.

11. The prior art Solomon British patent No. 405,316 discloses a device for aerating a liquid. Solomon provides a casing arranged to define a mixing chamber which has jet forming means at the upper end of the mixing chamber and air inlet means in the walls of the casing leading into the mixing chamber. Positioned in the mixing chamber are pegs upon which the jets of liquid impinge to effect a break-up of the liquid and intimate mixing of the liquid with air that is sucked into the mixing chamber by the movement of the lquid jets through the mixing chamber. An aerated mixture of liquid and air issues from the lower end of the solomon device.

(90):

12. Solomon disclosed three forms of his device. A comparison of Figures 2 and 7 of Solomon show different spacings between the jet forming means and the pegs upon which the jets impinge, and also show pegs of different diameters. These variations illustrate proportioning as disclosed in the Solomon patent.

13. The Solomon aerator is described with specific application to the nozzle of a beer tap. The Aghnides abandoned application, Serial No. 52,923, of which the application of the patent in suit, No. 2,210,846, was a continuation, describes the Aghnides mixing device as applicable for "drawing off beer". Aghnides' British patent 468,687, which Plaintiffs allege is the British counterpart of United States Patent 2,210,846, states that another practical application of the Aghnides device is "in drawing off beer".

There is no difference structure wise in a device for mixing water and air and a device for mixing beer and air. The Aghnides' patent may be used for either.

14. Aghnides, in his British patent 468,687 issued July 6, 1937, acknowledged that the device shown in Solomon 405,316 was a "liquid aerating device", by providing in the specification of said British patent a word picture of a prior aerating device, which word picture precisely describes Solomon. Aghnides thus admitted the prior British patent to Solomon as prior art, relating to a "liquid aerating device", and the Aghnides' patent 2,210,846 is entitled "Fluid Mixing Device". A "liquid aerating device" is the same as a "Fluid Mixing Device" and both relate to the same field of endeavor or art.
(91):

15. The prior art British patent to Battersby No. 323,242 issued December 30, 1929 is entitled "Improvements Relating To Apparatus For Aerating And Blending Liquids". Battersby provides an aerating device; and as to one form of such device, it is adapted to be attached to any ordinary domestic water tap for household use. The Battersby device includes a casing defining a mixing chamber and having jet forming means forming a single water jet at the upper end of the mixing chamber. Air inlet openings are provided in the casing through which air is sucked into the mixing chamber by the movement of the jet of water there through. A selectively adjustable "flow adjuster" is provided in the path of the jet of liquid for effecting break up and mixing of the water with the air that is sucked into the mixing chamber by movement of the jet of liquid through the mixing chamber.

The outlet end of Battersby is provided with "*any form of anti-splash device*". (Page 3, line 85).

16. The adjustable "flow adjuster" is for the purpose of "proportioning" the resistance to the flow of the jet, and proportionately breaks up the jet, more or less, as desired by the user of the device.

(92):

17. Typical anti-splash devices in existence at the time of the Battersby (British) patent 323,242 are shown in Vielliard (British) patent No. 12,345 of 1898, and Purser (British) patent No. 136,633 of 1919. The Vielliard and Purser anti-splash devices are designed for use on domestic and other taps to provide a regular (coherent), non-splash stream. The substitution of either the Vielliard or Purser anti-splash devices for the "form of anti-splash device" shown in Battersby produces a combination wherein the functions of both devices are combined, the Battersby portion providing aerated water from a domestic tap, and the anti-splash device providing that the aerated water from the domestic tap issues as a splashless coherent stream.

As to whether the word "form" in Battersby means a general type of anti-splash device or a very specific form or design is immaterial, since it would not constitute invention to substitute the type, form, or design of anti-splash device as shown in Vielliard British patent, or Purser British patent, for the type, or design, of anti-splash device shown in Battersby.

(93):

18. The prior art United States Aghnides' patent 1,912,113 issued May 30, 1933, and its British counterpart No. 375,066 dated June 23, 1932, are directed to a device for mixing water and air. In the path of the water and air which passes through the mixing device of these patents, there is an onion-shaped member. Below the onion-shaped member, and at the lower end of the device, there is a

constricted outlet which may be equipped with one or more wire gauze members which act as an anti-splash device. The device of this patent is for sucking air from a closed chamber. As to whether air is taken from all out doors or from a closed chamber is never known by the device mixing the air and water. In both cases the flow of water at high velocity induces air to be sucked in, and in both cases the water and air mix and are then discharged. The proportion of water to air or air to water may vary, but the varying of such proportion is not invention and is merely a matter of degree and within the skill of one in the calling.

(94):

19. The prior art United States patent to Ferguson No. 591,830 of 1897 is entitled "Apparatus For Mixing Liquids And Gases". Ferguson discloses a device for discharging a quiet (non-splash), non-spraying (coherent), bubbly, flow of water.

Ferguson discloses a casing and structure which encloses a mixing chamber for water and gas. Water is injected into the mixing chamber in an annular jet and this causes sucking of gas into the mixing chamber to effect a mixing of water and gas. Ferguson discloses that the mixture of water and gas would normally issue as a fine spray; but Ferguson wants to discharge the bubbly water in a quiet stream. Accordingly, Ferguson provides structure for collecting the fine spray of water and gas and then passes the mixture of water and gas first through a perforated member and then through a restricted discharge nozzle to cause the issuance of a quiet (non-splash), non-spraying (coherent), bubbly stream.

20. Ferguson teaches proportioning of orifice sizes to "*regulate easily the relative proportions of admixed liquid and gas*". (Page 1, lines 48-53).

(95):

21. The prior art United States patent to Claflin No. 881,548 discloses a device for mixing water and air. The Claflin device is shown in Figure 6 of the patent for use at the end of a faucet located in a dwelling or building. When the Claflin type faucet is performing its ordinary function of supplying water, a flow of air is induced by the flow of water therethrough and the air and water pass together from the outlet of the device. The particular means in Claflin for effecting mixing of the water and air is a converging-diverging type nozzle located between the inlet and outlet ends of the device. The outlet end of the Claflin faucet is provided with a pair of screen members and a converging nozzle therebelow.

In the abandoned Aghnides United States application, Serial No. 52,923, of which the application of the patent in suit No. 2,210,846 is a continuation, there is shown and disclosed in Figure 2 a converging-diverging type mixing nozzle for the water and air located between the inlet and outlet ends of the device, in the same fashion as shown in the Claflin patent. When Aghnides filed his original U. S. application for patent, from which stemmed patent 2,210,846, he disclosed to the Patent Office a number of equivalent structures, and the said Figure 2 of his now abandoned application, Serial No. 52,923, is thus equivalent to the devices for mixing water and air that he now shows in his patent No. 2,210,846. Figure 2 of the now abandoned application, Serial No. 52,923, is fully anticipated by the disclosure of the prior art Claflin patent.

(96):

22. The prior art United States patent to Lockwood 1,195,044 shows a device for mixing liquid and gases. The particular apparatus for effecting mixing of liquid and gases is shown in Figure 2 and includes a casing defining a

mixing chamber and having jet forming means at the upper end of the mixing chamber. There is also provided a set of three vertically stacked conical deflectors for effecting mixing of the liquid and gas. The lower end of the casing is provided with a constricted throat through which the mixture of liquid and gas passes.

In the abandoned Aghnides application, Serial No. 52,923, of which the application of the patent in suit No. 2,210,846 is a continuation, there is shown and disclosed in Figure 3 an apparatus for effecting mixing of liquid and gas which includes a vertically arranged stack of three conical nozzles arranged in substantially the same manner as shown in the Lockwood prior art patent, Figure 3 of said application, Serial No. 52,923, at the time of the filing by Aghnides in the United States of his original application was disclosed to be the equivalent of what is now claimed by said patent No. 210,846. Figure 3 of the now abandoned application, Serial No. 52,923, is anticipated by the disclosure of the prior art Lockwood patent.

23. The concept of proportioning the various parts of an aerating device to obtain desired results is disclosed in the prior art patents of Hyatt, Solomon, Battersby and Ferguson. (See Findings of Fact Nos. 9, 12, 16 and 20.) (97):

24. Plaintiff produced a model of the Felten device and tested same in open Court. The complete Felten model produced a coherent aerated stream. The issuing stream was white in appearance, emerged in a popular coherent column, and did not splash. There were air bubbles in the issuing stream.

Plaintiff produced a model of Aghnides 1,912,113 and when tested it discharged a regular, coherent, non-splash column, whitish in appearance, and containing air bubbles therein.

Plaintiff produced a model of Battersby and when tested in open Court it produced an aerated stream of water which was whitish in appearance and contained air bubbles therein.

25. The device charged to infringe is in the record as Plaintiff's Exhibit 19 and is illustrated in Plaintiff's Exhibit 34. The device charged to infringe effects a mixing of water and air by means of a solid onion-shaped member against which jets of water are directed.

The screen at the lower end of the casing of the device charged to infringe does not operate to effect an additive mixing of water and air, but rather operates to reduce the amount of air that is mixed with the water which passes therethrough.

(98):

26. Insofar as the accused device uses a solid onion-shaped member, against which the water is dire ted, to effect a mixing of water and air, the accused device is like and follows the prior art which includes:

(a) the disclosure in Battersby which uses a solid peg member, against which the water is directed, to effect the mixing of water and air;

(b) the disclosure in Solomon which uses four peg members, against which the liquid is directed, to effect the mixing of liquid and air; and

(c) the disclosure in Aghnides (U. S.) 1,912,113 which uses an onion-shaped member, against which the water is directed, to effect the mixing of water and air.

27. The two Aghnides patents here in suit have been before this Court in the case of Aghnides v. The Meyer's Company, 99 USPQ 335. In that suit this Court entered the following, in Finding XXIX:

> • • • the Defendant offered no evidence in support of its defense, did not cross-examine any witnesses, and entered no motions • • •

The device which was involved in the previous *Meyer's* case is in evidence as Defendant's Exhibit 38. The accused device in the *Meyer's* case utilized therein "resistance screens" to effect the mixing of water and air.

(99):

28. The Aghnides patent 2,210,846 has previously been involved in a suit entitled *Aghnides* v. *Goodrie et al*, 7 Cir., 210 F.2d 859. In the *Goodrie* case the Court of Appeals of the Seventh Circuit found patent 2,210,846 to be invalid. The device which was charged to be an infringement in the *Goodrie* case, is in evidence here as Defendant's Exhibit 39, and is illustrated in Defendant's Exhibit 40. The accused device in the *Goodrie* case utilized therein an onion-shaped member, against which the water was directed, to effect the mixing of water and air.

In its decision in the *Goodrie* case, the Court of Appeals of the Seventh Circuit said, 210 F.2d 859, at page 863:

> "If for the moment we indulge the presumption of validity, we think Aghnides' claims must be very narrowly construed and limited to the specific structure disclosed by him. Consequently, defendants, who do not employ the same structure, but prescribe a different means for separating the incoming water into jets, does not infringe."

(100):

29. Structurewise, the internal physical structure of the accused device herein (Plaintiff's Exhibit 19), bears a much closer resemblance to the internal physical structure that was before the Seventh Circuit in the *Goodrie* case (Defendant's Exhibit 39), than it does either to the internal physical structure of Plaintiff's commercial device, (Plaintiff's Exhibit 29), or to the internal physical structure of

the device involved in the *Meyer's* case (Defendant's Exhibit 38), or to the internal physical structure shown in the figures of Patent No. 2,210,846.

The accused device herein does not employ resistance screens for the purpose of breaking up and effecting an additive mixing of water and air as is disclosed and claimed in patent No. 2,210,846. The accused device uses a different means for effecting mixing of water and air. The accused device includes a solid onion-shaped member against which jets of water are directed for effecting the mixing of air and water, and in that respect the accused device follows Solomon or Battersby and differs from the resistance screens disclosed in the patent in suit.

(101):

30. Each of Claims 1-4 of Aghnides 2,210,846 specifies "resistance" for mixing the water with air. Consequently throughout the specification of patent 2,210,846 the word "resistance" is used in conjunction with the word "screen". The word "resistance" is never used in the description of the device shown in Figure 6 of patent 2,210,846. The word "resistance" is never applied to, or used in conjunction with, the description of the devices shown in Figures 5, 6, 7 and 8 of patent 2,210,846.

Claims 1-4 of Aghnides 2,210,846 are limited to constructions which include "resistance-screens" for effecting the mixing of the water and air. Hence, Claims 1-4 of Aghnides 2,210,846 do not read on Figure 6 of the patent.

The Plaintiffs assert that the structure of the accused device is closest to the structure shown in Figure 6 of the patent. Since Claims 1-4 of the patent do not read on Figure 6 thereof, then said Claims also fail to read on the accused device.

31. The Claims of Aghnides 2,210,846, are limited to the use of resistance-screen elements for effective additive mixing of water and air. The accused device does not

employ resistance-screens for the purpose of effecting additive mixing of water and air. The accused device uses an onion-shaped member for such additive mixing of water and air. Hence, there is no infringement of the Claims of 2,210,846.

(102):

32. Devices for mixing together water and air, or liquid and gas, so as to achieve a flow of bubbly mixture were known prior to Aghnides' earliest claimed date of invention. Such devices are shown in the prior art patents of Felten, Solomon, Battersby, Aghnides (1,912,133) and Claflin.

Devices for attachment to taps or faucets for regulating the flow of water or other liquids so as to form a regular (coherent) column which does not splash were known prior to Aghnides' earliest claimed date of invention. Such devices are shown in the prior art patents of Vielliard and Purser.

33. Devices for mixing water and air, or liquid and gas, together so as to achieve a flow of bubbly mixture, in combination with an anti-splash device—or means for obtaining a quiet non-splash discharge of said mixture—were known prior to Aghnides' earliest claimed date of invention. Such devices are shown in the prior art patents of Felten, Battersby, Claflin, Ferguson, Aghnides (1,912,113), and Hyatt.

34. In view of the state of the prior art it was not invention for Aghnides to combine a device for mixing water and air, to achieve a bubbly stream, with a device for forming a regular non-splash column, particularly since such a combination of elements was either taught or disclosed by the prior art patents of Felten, Battersby, Ferguson, Aghnides (1,912,113), Chaflin and Hyatt.

(103):

35. The state of the prior art was such at the time of Aghnides entry into the field that any skilled delver in the art of mixing liquids and gases could have built Aghnides' device, and Aghnides did not achieve invention but accomplished the result of a skilled mechanic.

36. All of the prior art references herein relied upon by Defendant, except Felten, were not before the Examiner in the Patent Office during the prosecution of the application resulting in patent 2,210,846. Patent 2,210,846 is not entitled to a presumption of validity because the art here relied on was not before the Examiner or the Board of Appeals of the Patent Office.

(104):

37. Figure 6 of patent 2,210,846 was first disclosed in the United States on December 31, 1937. Figure 6 of patent 2,210,846 was not disclosed or shown in Aghnides Belgian patent or Aghnides abandoned United States patent application, Serial No. 52,923.

Aghnides British patent 468,687 contains a disclosure in words of the same subject matter shown and disclosed by Figure 6 of patent 2,210,846.

The word disclosure reads as follows:

> "It has been proposed to provide a liquid aerating device comprising a tubular member having a lower hollow part and a relatively solid upper part in which were arranged liquid passages alternating with short passages communicating with atmosphere at the sides of the device, whilst the lower hollow part supported a number of pegs below and transverse to the liquid passages."

As to whether such word disclosure is descriptive of the Solomon British patent No. 405,316 or is a description of Figure 6 of patent 2,210,846 is immaterial. Both are the same. The word disclosure is in a prior patent by

Aghnides, which was filed in a foreign country more than twelve months before the disclosure to the U. S. Patent Office, and it issued prior to disclosure to the U. S. Patent Office.

The Aghnides British patent issued July 6, 1937 before the filing date and disclosure of Figure 6 of patent 2,210,846 on December 31, 1937, and said British patent was based on an application filed more than twelve months prior to the filing date of Figure 6 of patent 2,210,846.

Under the provisions of R.S. 4887, 35 U.S.C. § 102 (d), Figure 6 of 2,210,846 could not validly be patented. Figure 6 of 2,210,846 is closest to the accused device. If the claims of patent 2,210,846 are construed to read on Figure 6 then the patent is invalid. If the claims of 2,210,846 are not construed to read on Figure 6 thereof, then there is no infringement of the patent by the accused device.

(105):

38. Figure 8 of patent 2,210,846 is now concededly old and unpatentable. Positive written statements in the file wrappers of the abandoned United States patent application Serial No. 52,923 and of patent 2,210,846, and written statements in the specification of patent 2,210,846 and written statements to the Board of Appeals, all show that both Aghnides and the Patent Examiner considered Figure 8 to be a form of the claimed invention. The Patent specification and file wrappers so state. When patent 2,210,846 issued in 1940, it contained Figure 8 and the claims applicable thereto, as asserted by Aghnides all through the years that such application was pending, and the device of Figure 8 has been held out to the public, continuously since 1940, as being covered by the claims of 2,210,846.

At no time did Aghnides make any attempt to amend or correct patent 2,210,846 in the manner as provided for by statute, either by way of Reissue (35 U.S.C. Patents 1952 § 251), Disclaimer (35 U.S.C. Patents 1952 § 253) or Cer-

tificate of Correction (35 U.S.C. Patents 1952 § 254 and § 255).

39. It would require experimentation to achieve the results which allegedly are disclosed in 2,210,846. There are no critical limits set forth in 2,210,846 since one who is making a device in accordance therewith can start with one screen, and then add a second, third, or fourth, as desired, to achieve the results sought. Accordingly, patent 2,210,846 is void for non-disclosure.

(106):

40. All commercial devices sold by licensees of Aghnides included the alleged improvement features of patent No. 2,316,832. There is no commercial success attributable to patent 2,210,846.

41. The Aghnides patent 2,316,832 is directed merely to an improvement over the earlier Aghnides patent 2,210,846. The alleged improvement in patent 2,316,832 over patent 2,210,846 lies in the addition of a "restricted orifice", "foraminous member", or "apertured diaphragm", or a combination of two such elements, upstream of the structure disclosed in patent 2,210,846.

The specification and file wrapper discloses that insofar as patent 2,316,832 is concerned, the words "restricted orifice", "foraminous member", and "apertured diaphragm", mean the same thing and can be applied to the same structure.

42. Aghnides first visited the United States in June 1937. At that time the only pending U. S. patent application was the later abandoned application, Serial No. 52,923. During 1937 he licensed certain manufacturers including The Chicago Faucet Company of Chicago under his then pending patent application Serial No. 52,923.

(107):

43. Prior to Aghnides' licensing of Chicago Faucet Company in 1937, The Chicago Faucet Company had been manu-

facturing and selling a faucet attachment known as the "Quixtop" device. The "Quixtop" device included a screen positioned across the discharge end of the faucet spout which was retained in position by a ring that was threaded to the inside of the faucet spout, the ring being of smaller internal diameter than the internal diameter of the faucet spout.

When The Chicago Faucet Company came on the market with their aerator licensed under Aghnides' then pending patent application, Serial No. 52,923, they retained their "Quixtop" device at the discharge end of their faucet spout and secured the Aghnides aerator to the lower end of the "Quixtop" device. The combination of the "Quixtop" device and the aerator made in accordance with Aghnides' then pending patent application results in a combination which anticipates each of the claims of patent 2,316,832.

44. Chicago Faucet Company produced from their books and records, kept in the normal course of business, drawings showing the initial construction of their aerator, purchase order records, and other pertinent records. These records of Chicago Faucet Company showed that parts were purchased, in quantities of more than 1,000 units for use in The Chicago Faucet aerator, and were on hand at The Chicago Faucet Company no later than February 15, 1938.

Advertisements taken from Domestic Engineering Magazine showed that The Chicago Faucet Company aerators were offered on sale as early as March 1938. Sales were proved as early as May 1938 and a shipment of an aerator to Aghnides was made as early as April 14, 1938.
(108):

45. The filing date of the application resulting in patent No, 2,316,832 is April 5, 1940.

Aghnides did not produce a single document establishing a date of his invention, in the United States, of the device

shown in patent No. 2,316,832, earlier than the filing date of April 5, 1940.

The only testimony that Aghnides offered to overcome the earlier dates of knowledge, invention, sale or offer for sale in this country by The Chicago Faucet Company was his uncorroborated oral testimony that he disclosed the improvement of a restricted orifice to The Chicago Faucet Company in 1937, before he left this country in December, 1937.

The foregoing oral testimony of Aghnides was directly contrary to oral testimony he had previously given in a deposition taken on December 6, 1954.

The uncorroborated testimony of Aghnides is insufficient to establish a date earlier than his filing date of April 5, 1940.

Aghnides is limited to the filing date of April 5, 1940, as the earliest date of invention.

(109):

46. In attempting to carry his date of invention of patent No. 2,316,832 back to a date earlier than the earliest date of knowledge, or offer for sale, by The Chicago Faucet Company, Aghnides testified orally, and without corroboration, that in 1937 he brought to the United States a commercial device manufactured by his French licensee, which commercial French device included therein a restricted orifice as disclosed in patent No. 2,316,832.

Aghnides testified that he demonstrated the commercial French device in the United States in 1937.

If the French commercial device is usable and sufficient by Aghnides to carry his date of invention back of the dates proved by The Chicago Faucet Company, then it is likewise usable and sufficient to establish public use in this country more than two years prior to the filing date of April 5, 1940.

The demonstration of the commercial French device in 1937 was a public use that took place more than two years prior to the date of April 5, 1940, which was the filing date of the application resulting in patent No. 2,316,832.

(110):

47. The Solomon British patent 405,316 discloses that a First Provisional Specification No. 21,752/32 was filed August 3, 1932. A Second Provisional Specification No. 24,024/32 was filed on August 27, 1932 and described therein an improvement over the device disclosed in the First Provisional Specification.

Figures 1-5 of Solomon 405,316 shows the aerating device disclosed in the First Provisional Specification.

Figures 6-11 and 12-17 show two forms of improved devices disclosed in the Second Provisional Specification.

(111):

48. The improved forms of aerator in Solomon 405,316 differ from the basic form of aerator disclosed therein, in the same features that the Aghnides' second patent (No. 2,316,832) differs from Aghnides' first patent 2,210,846.

In the improved aerator forms shown in Figures 6-11 and 12-17 of Solomon, there is shown an aerator structure corresponding to the basic form of aerator shown in Figures 1-5 of Solomon, and in addition there is provided an anti-drip valve construction upstream of the basic aerator construction. The anti-drip valve construction includes a disc member having a restricted orifice therethrough and a valve member positioned below the restricted orifice.

When the valve member is depressed, as it would be when liquid is flowing through the device, then the valve member cooperates with surrounding casing structure to define an annular orifice, or aperture, upstream the basic aerator construction and below the aforesaid restricted orifice. This arrangement is shown in Defendant's Exhibits 44-10-B and 44-10-C.

The improvement construction in Solomon 405,316 completely anticipates the structure in Aghnides patent 2,316,832 which is alleged to be an improvement over the earlier Aghnides patent 2,210,846.

(112):

49. In Plaintiff's Exhibit 33, Plaintiffs apply Claim 1 of 2,210,846 to the accused device which is there illustrated, and read the phrase *"a diaphragm at the upstream end of the chamber"* on the disc 36.

The improvement of the second Aghnides' patent over the first Aghnides' patent requires additional structure which provides a "restricted orifice", "foraminous member" or "aperatured diaphragm", located upstream, or above, the *"diaphragm at the upstream end of the chamber"*.

In the illustration of the accused device in Plaintiff's Exhibit 33, there is no structure of the accused device there shown which provides a "restricted orifice", "foraminous member" or "aperatured diaphragm", located upstream, or above, the disc 36, which Plaintiffs have identified as the *"diaphragm at the upstream end of the chamber"*.

The claims of the second Aghnides' patent, therefore, cannot be read on the accused structure illustrated in Plaintiff's Exhibit 33, because there is no additional structure there illustrated which responds to the requirement of the second patent that said additional structure be located upstream, or above, the *"diaphragm at the upstream end of the chamber"*.

(113):

50. The adapter that is sold with the accused aerator serves only to modify existing faucets so as to provide screw threads to which the aerator may be connected. The adapter is not necessary or essential to the aerating operation of the accused device. Plaintiff's Exhibit 34 states that the adapter is unnecessary and should not be used

with faucets already having screw threads of the correct size for direct attachment of the aerator.

However, the additional structure which is the alleged improvement of the second Aghnides' patent over the first Aghnides' patent is necessary and essential to the operation of Plaintiff's commercial device.

The adapter of the accused device differs both in purpose and function from the alleged improvement of the second Aghnides' patent. The claims of the second Aghnides' patent 2,316,832, therefore, do not read on the accused aerator in combination with the adapter with which it is sold.

(114):

DEFENDANT'S CONCLUSIONS OF LAW

1. The Court has jurisdiction of this cause.

2. Each of Claims 1-4 of Aghnides patent 2,210,846 are anticipated by the prior art patents of:

Felten (British)	26012 of 1909
Hyatt (U. S.)	326,221
Ferguson (U. S.)	591,830
Claflin (U. S.)	881,548
Lockwood (U. S.)	1,195,044
Aghnides (U. S.)	1,912,113
Battersby (British)	323,242, and
Solomon (British)	405,316

and said claims are invalid in view thereof.

3. The device disclosed in Aghnides patent 2,210,846, its purpose, use, and function are anticipated by the combination of prior art patents of:

(a) Battersby (British) 323,242, and
Vielliard (British) 12,345 of 1898
or Purser (British) 136,663 or

(b) Solomon (British) 405,316 and
Vielliard (British) 12,345 of 1898
or Purser (British) 136,663,

and said Claims are invalid in view thereof.

4. Aghnides patent 2,210,846 is invalid in view of the statutory provisions of R.S. 4887, 35 U.S.C. Patents (1952) § 102(d), and in view of the disclosure in Aghnides' (British) patent 468,687 which issued prior to the filing date of Figure 6 of patent 2,210,846 on an application filed more than twelve months prior to December 31, 1937, which is the filing date of Figure 6 of patent 2,210,846.

(115):

5. Aghnides patent 2,210,846 is invalid for "non-disclosure" in view of the statutory provisions of R.S. 4888, 35 U.S.C. Patents (1952) § 112.

6. The Aghnides patent 2,210,846 is invalid because the claims thereof read on the form of device shown in Figure 8 thereof, which device of Figure 8 is admittedly old in the prior art.

7. The Aghnides patent 2,210,846 is invalid because the state of the prior art as set forth above in Conclusion No. 2, of which he was bound to take notice, was such that any skilled delver in the art of mixing gases and liquids could have built Aghnides' device, and, therefore, Aghnides did not achieve invention but accomplished the result of a skilled mechanic.

8. Claims 1-4 of Aghnides patent 2,210,846 are not infringed by the accused device.

9. Each of the Claims 1-4 inclusive, of Aghnides patent 2,316,832 is invalid in view of the statutory provisions of R.S. 4886, 35 U.S.C. Patents (1952) § 102(a), because the alleged invention of patent 2,316,832 was known and used by The Chicago Faucet Company in this country before the earliest date of invention thereof proved by Aghnides.

(116):

10. Each of the Claims 1-4, inclusive, of Aghnides patent 2,210,846 is invalid in view of the statutory provisions of R.S. 4920, 35 U.S.C. Patents (1952) § 102(g), since The Chicago Faucet Company was the first inventor in this coun-

try of a device upon which the claims of patent 2,316,832 read, and which device of The Chicago Faucet Company was neither abandoned, suppressed, or concealed.

11. Each of Claims 1-4, inclusive, of Aghnides patent 2,316,832 is invalid in view of the statutory provisions of R.S. 4886, 35 U.S.C. Patents (1952) § 102(b) in view of the offer for sale by The Chicago Faucet Company, in March 1938, more than two years prior to the filing date of April 5, 1940, of devices embodying the subject matter of the claims of patent 2,316,832.

12. Each of Claims 1-4, inclusive, of Aghnides patent 2,316,832 is invalid in view of the statutory provisions of R.S. 4886, 35 U.S.C. Patents (1952) § 102(b) in view of the public use of devices allegedly embodying the invention of patent 2,316,832, by Aghnides while he was in the United States between the dates of June and December, 1937.

13. Each of Claims 1-4, inclusive, of Aghnides patent 2,316,832 is anticipated by the prior art patent of Solomon (British) 405,316, and said claims are invalid in view thereof.

(117):

14. The Aghnides patent 2,316,832 is invalid because the state of the prior art, of which he was bound to take notice, was such that any skilled delver in the art of mixing gases and liquids could have built Aghnides' device, and, therefore, Aghnides did not achieve invention but accomplished the result of a skilled mechanic.

15. Claims 1-4, inclusive, of the Aghnides patent 2,316,832 are not infringed by the accused device.

(Western Union Telegram)

P B 113 (48)

1955 Oct 7 AM 8 56

P WY 004 DL PD—NSH New York NY 7 845 AME—
Will Freeman and Norman Lettvin Esqs—
Bair Freeman and Molinare 1400 Field Bldg
135 South La Salle St Chgo—

RE AGHNIDES ET AL VS KRESS. YOU INSTRUCTED DISMISS COUNTERCLAIM AND WITHDRAW DEFENSE OF MISUSE AND DEFEND OUR CASE ON BASIS OF NON-INFRINGEMENT AND INVALIDITY OF PATENTS—

S. H. Kress and Co—
Received Oct 7—1955 10:15 a.m. Bair, Freeman & Molinare.

(Letterhead of S. H. Kress & Co.)

October 7, 1955

Will Freeman and
Norman Lettvin, Esqs.
Bair, Freeman & Molinare
1400 Field Building
135 South La Salle Street
Chicago 3, Illinois

Re: Aghnides et al v. Kress

Gentlemen:

This is to confirm telephone conversation between Mr. Freeman and Mr. Lettvin of your firm and Mr. Wiggins and writer representing S. H. Kress and Company, wherein we instructed your firrm to dismiss the counterclaim

and withdraw the defense of misuse in the above entitled action and to defend our case on the grounds of non-infringement and invalidity of patents.

Yours truly,
S. H. Kress & Co.
E. M. Taylor
E. M. Taylor
Legal Division

Special Delivery—Air Mail
EMT/L

(119):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

NOTICE OF MOTION

To: Albert R. Ely, Esq.,
E. R. Hamilton, Esq.,
Ely, Frye & Hamilton
Akron, Ohio
and
R. Morton Adams, Esq.,
Thomas F. Reddy, Jr., Esq.,
Pennie, Edmonds, Morton,
Barrows & Taylor
New York, New York
Attorneys for Elie P. Aghnides and Chase Brass & Copper Co., Inc.

Please Take Notice that we have this day forwarded to the Clerk of the United States District Court at Greensboro, North Carolina, the attached Motion to Reopen for Additional Proofs, together with the papers referred to in the Memorandum in support of the Motion, for presentation to Judge Johnson Hayes.

January 24, 1956 Norman Block

(120):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

MOTION TO REOPEN FOR ADDITIONAL PROOFS

Comes now the attorneys for Defendant, and move to reopen this cause for additional proofs to show (a) that the Aghnides earliest invention date as to United States Patent 2,210,846 is December of 1937, and (b) that his testimony carrying his date back to the Belgium Patent 406,702 filed December 8, 1934 and granted on January 31, 1935 is false.

Norman Block
Attorney for S. H. Kress & Company

Will Freeman
Of Counsel

In support of the foregoing Motion, there is filed herewith the following Memorandum. Counsel respectfully requests permission to argue this Motion orally.

Will Freeman

(121):

MEMORANDUM

The additional proofs relate to the patent representations made by Aghnides to this Court in the instant case and likewise in the Meyer's case, and the directly contrary representations made to the Canadian Patent Office in connection with his Canadian Patent 490,112.

The Canadian Patent contains the identical five claims as found in his United States Patent 2,210,846.

The Findings in the Meyer's case was entered by this Court on November 12, 1953, and later this Court wrote an opinion filed on January 20, 1954. Finding No. 10 in the Meyer's case reads as follows:

"X. The basic invention of Patent No. 2,210,846

was disclosed in applicant's Belgian Patent 406,702 filed in Belgium December 8, 1934. The first application for patent in the United States was filed December 4, 1935 as Serial No. 52,923. During the pendency of the said application Serial No. 52,923, the application on which the patent in suit issued was filed December 31, 1937, Serial No. 182,884, as a continuation of application Serial No. 52,923, whereupon application of No. 52,923 was abandoned." (Aghnides *v.* Meyer's Co., 99 USPQ 335)

This Court, in its opinion based upon the representations made to it in the Meyer's case, said: (122):

"The basic patent, 2,210,846, dates back to December 8, 1934, having been field by plaintiff in Belgium where he then resided. The application in this country was filed December 31, 1937 as a continuation of one filed December 4, 1935."

This statement by the Court, and Finding No. 10 in the Meyer's case, are in direct conflict with Aghnides' statement and representations made to the Canadian Patent Office, wherein on May 5, 1947 he stated:

"There is an important fact to remember, however; the said Belgian 1934 application *did not* disclose fully the bubbly-stream principle disclosed in Holland, Sweden, the United States patent No. 2,210,846, the instant Canadian case and British Specification No. 625,084.

"It is only in December 1937 that the ways and means of making a bubbly-stream were disclosed when the United States text (application No. 182,884) was rewritten, although the Convention Belgian application did mention the emulsion of air in a water stream.

"Therefore, the priority claims in the present case are correct and support properly the instant disclos-

ure: it is the Belgian Convention which, in the United States patent No. 2,210,846 confuses the issue because, actually, said Belgian case does not teach the bubbly-stream as it is known to-day." (Emphasis Aghnides.)

And again on October 28, 1952 stated:

"Belgian Patent No. 406,702 does not describe the bubbly stream as disclosed in the present case and consequently cannot be opposed to the present application."

(123):

Incidentally, on November 13, 1951 between the two dates referred to in connection with the representations made to the Canadian Patent Office, a representation was made to the District Court in Chicago as to present Patent No. 2,210,846 as follows:

"At the time he made this invention he was living in Brussels and was engaged in hydraulic engineering pursuits for which his education and ability had fitted him. He perfected the invention in Belgium and applied for a Belgian patent on December 8, 1934. He had considerable acceptance of his invention in Europe and made his first application for patent in this country on December 4, 1935.

"Under the so-called International Convention, he is entitled to December 8, 1934, the date of his filing in Belgium, as the date of his invention in this country."

In the instant case Patent No. 2,210,846 was represented from the Opening Statement on through the close of the trial—three different sessions covering a period of about eleven months—*that it dates back to the Belgian Patent filed in December*, 1934.

Throughout the trial—notwithstanding a rather vigorous cross-examination of Aghnides, he constantly and repeat-

edly testified that the Belgian Patent 406,702—the British Patent 468,687—and his United States Patent No. 2,210,846 were one and the same as to principle, mode of operation, (124):

function and result, and that each was the equivalent of the other. When British Patent 468,687 was offered in evidence by Defendant's counsel, it was objected to because it was not prior art and filed within the Convention.

"Mr. Ely: I certainly don't see the purpose of that, Your Honor. This man's British patent is on file within the date of the convention. I don't see what it's all about." (Transcript, P. 179)

Aghnides time and again testified that United States Patent No. 2,210,846 was based on the Belgian Patent 406,702 filed in December of 1934.

"Q. Can we agree that the disclosure corresponding to Figure 6, where you have inwardly projecting projections from a shoulder—and I'm not raising any question about terminology—that Figure 6 is shown for the first time in your United States application filed on December 31, 1937?

A. Figure 6 as is shown there, correct, in that form.

"Q. And it was not shown in the original application that you filed in the United States on December 4, 1935?

A. The figure as is there was not shown, *but my Belgian application, on which the American application was based,* stated that baffles are in the path of the water, or screens; so these are baffles.

"Q. Will you agree with me that the Belgian patent did not show any counterpart or any figure corresponding to Figure 6?

A. Not exactly to Figure 6, no, but it explained that it could strike plain surfaces, which is baffles.

(125):

"Q. Can we also agree that the British patent number 468,687, Defendant's Exhibit 14, does not show any figure corresponding to Figure 6?

A. No, it does not show; those drawings do not show a figure corresponding to Figure 6 of my U. S. patent.

"Q. And is it not true that the Belgian patent does not show any figure corresponding to Figure 6?

A. No, but the specification states, though, it could be baffles, and shows the preferred form of resistance, which is screens." (Emphasis Ours) Transcript, P. 794-5.

There is no question but what counsel for both sides conducted the case on the basis that Aghnides claimed the Belgian Patent 406,702, British Patent 468,687 and United States Patent 2,210,846 were all one and the same as to *date of invention*, and that the structure here involved of Patent No. 2,210,846 was shown in the Belgian Patent 406,702 and the British Patent 468,687.

"Q. But we can agree that there are no drawings in your British patent, as well as your Belgian patent, showing inwardly extending projections or shoulders as we find in Figure 6 of your U. S. patent?

"Mr. Adams: Which British patent?

Mr. Freeman: The British patent that has to do with the structure here involved. It is number—

Mr. Adams: 468,687?

Mr. Freeman: That's right.

"A. I would, however, say that in Figure 5 of this British patent here, which is, I believe, the same as the corresponding figure of the Belgian application, we see that the orifice through which the water comes out the perforated plate 5 is above the shoulder, so

the water might very well strike before getting to the screens and be partly broken up.

(126):

"Q. Now do you find in Figure 5 a structure corresponding to projections that extend inwardly from the walls of the mixing chamber, or the tube which forms the mixing chamber?

A. Yes, I find there walls projecting inwardly, above which are some of the orifices in the perforated disc 5.

"Q. Will you state now that you rely on Figure 5 of either your British patent or your Belgian patent as a basis for the disclosure of Figure 6 in your patent number 2,210.846, filed December 31, 1937?

"Mr. Adams: May I ask what you mean by 'rely'? Do you mean as a matter of law, or the immediate disclosure; which are you talking about?

Mr. Freeman: The immediate disclosure. I'm not trying to get into any law questions with Mr. Aghnides.

"A. Well, that Figure 6 is in accordance with the disclosure made in my Belgian patent, which is speaking of baffles and which also shows in Figure 5 a stream which could strike first an inclined surface before reaching the screens. It is not an exact duplicate, but according to the same principles.

"Q. In other words, for the purpose of establishing Figure 6, which has an inwardly extending shoulder or projections, Figure 5 is the closest, or at least approximates in structure and function, that which is called for in Figure 6?

A. It is the same idea, yes." (Transcript, PP. 796 and 797.)

Aghnides' testimony as to the Belgian Patent 406,702, the British Patent 468,687 and their relation to United

States Patent 2,210,846 was so emphasized by him that the Court at Page 798 of the Transcript said:

"The Court: Didn't you go over all of that on your cross-examination previously?"

(127):

With the hedging and devious explanations apparent from the completed testimony of Aghnides, counsel for Defendants became suspicious at the close of trial that there was something in the wood pile other than just wood, and began some searching for information in foreign countries involving the Aghnides patents—a procedure *not* normally taken in a patent case.

Such search by Defendants now discloses a file wrapper history of Canadian Patent 490,112, which has some startling and revealing statements that make the testimony by Aghnides false before this Court, and the representations by counsel for Aghnides as to the Belgian and British patents erroneous. We are not charging that any of the Aghnides' or Chase's counsel in this case knew of the Canadian patent and its file wrapper history, where Aghnides definitely denies any *carry back of the subject matter of Patent No.* 2,210,846 *to either the Belgian Patent* 406,702 *or British Patent* 468,687.

When Aghnides was cross-examined in this case with respect to the British Patent 468,687, and testified that it was *the same invention* as United States Patent 2,210,846, *he then knew that he had presented factual information to the British Patent Office* that said British Patent 468,687 was *a different invention* than the structure now claimed

(128):

in Patent No. 2,210,846 and that disclosed in British Patent 625,084. The drawings of Canadian Patent 490,112 are *identical* to the drawings of British Patent 625,084. The Canadian Patent claims, *identical* to the claims of United

States Patent 2,210,846, must, of course, read on the British Patent 625,084 drawings, because as above stated, the drawings are *identical*.

Aghnides, in Canada, stated:

> "The same remarks apply also to the British Specification No. 468,687 which was filed December 4th, 1935, prior to the first disclosure of the bubbly-stream in United States, December 1937.
>
> "As a matter of fact, the British Examiner, during prosecution of British Patent No. 625,084, embodying the principle presently claimed, did oppose the Applicant's prior patent No. 468,687 as pertinent art. Upon presenting proper factual arguments, and submitting a model showing the differences between the two applications, the citation was withdrawn and patent No. 625,084 issued."

Aghnides, in the Canadian Patent Office, states flatly that his United States Patent 2,210,846 and British Patent 625,084 and his application resulting in his Canadian Patent 490,112 are *one and the same*. In his Canadian application he stated:

> "The foreign cases corersponding to the present application are as follows:
>
> U. S. Patent No. 2,211,846 issued Aug. 6th, 1940
> Dutch Patent Application filed June 22nd, 1939
> Swedish Patent Application filed June 26th, 1939
> British Patent No. 625,084 issued Sept. 6th, 1949"

(129):

The "Dutch Patent Application filed June 22nd, 1939", stated by Aghnides in Canada to correspond to his U. S. Patent 2,210,846 and his Canadian application resulting in Patent 490,112, issued as Dutch Patent 65,293 on March 15, 1950. The first seven figures of the Dutch Patent drawing are identical to the seven figures of Aghnides British Patent 625,084, and in fact the British Patent

625,084 is relied upon as a basis for an earlier priority date of invention as to Claim 1 of the Dutch patent.

Aghnides' Dutch Patent 65,293 includes seven figures in the drawing *identical* to the drawing of his Canadian Patent 490,112 and British Patent 625,084. In Canada, the Canadian, Dutch and British 625,084 Patents are stated under oath to be for the same invention as U. S. Patent 2,210,846, and the date of invention is December 1937. Despite this position taken by Aghnides in Canada, he states on the face of his Dutch Patent 65,293 that it is a *different* invention from his French Patent 800,069, which in turn is stated on its face to be for the same invention as the Belgian Patent 406,702 filed in December 1934. Before this Court, Aghnides has sworn that his U. S. Patent 2,210,846 and his abandoned application Serial No. 52,923 are for the same invention, and his date of invention is that of his Belgian Patent, December 1934.
(130):

It is very interesting that the drawings for the French Patent and the abandoned U. S. application are, however, *identical*. Thus Aghnides holds out to the public on the one hand that his Dutch Patent is the same as his U. S. Patent, but that it is different from his French Patent which has a drawing disclosure identical to the abandoned U. S. application upon which the U. S. Patent relies for its 1934 date of invention.

There can be no question but that the abandoned U. S. application Serial No. 52,923 is relied upon by Plaintiffs as teaching the same invention as both the Belgian Patent 406,702 and the U. S. Patent 2,210,846.

> "Mr. Ely: I want to introduce as Plaintiff's Exhibit No. 15 a certified copy of the file history of the abandoned U. S. application by Mr. Aghnides, Serial No. 52,923.

"Your Honor perhaps does not recall, but in the Meyers case it was brought out that Mr. Aghnides filed an application in this country within one year from the date of filing of the Belgian application. That was subsequently abandoned and the first patent in suit was filed in continuation of this abandoned application I have just offered. *So there is a continuity that goes all the way back to the filing date of Aghnides in Belgium, established through this abandoned application.*" (Emphasis ours.) (Transcript, P. 34.)

Again in the testimony of Aghnides:

"The Witness: I see Figure 1 of my abandoned application to be the same as Figure 1 and Figure 4 (131):

and Figure 2 of the application which matured into a patent, because they all show diaphragms with plurality of holes, they all show air inlets leading into the chamber below the diaphragm, and they all show screen means below the air inlets." (Transcript, P. 169.)

Equity does not demand that Aghnides shall have led a blameless life, *but it does require that Aghnides shall have acted fairly and without fraud or deceit as to the controversy in issue.*

Aghnides testified at length in this case—in the Meyer's case—and asserted that his invention date was the Belgian patent filing date—when at the time he testified he knew as a fact that *he had represented otherwise to the British Patent Office.* Such testimony was neither fair nor frank as required of one who seeks equity. He likewise knew at the time he testified that he had presented *contrary facts peculiarly within his knowledge* to the Canadian Patent Office, that Patent No. 2,210,846 was first invented when the text thereof was rewritten in December, 1937. Before this Court he asserts the invention date as being

three years earlier, to-wit: the filing dated of the Belgian patent—December, 1934. Withholding of facts having a direct bearing on the very issue involved constitutes "undisclosed facts" of the kind considered and condemned by the Supreme Court in the Precision Instrument case cited later herein.

(132):

Aghnides' Oath executed and sworn to by him in the United States on December 14, 1937 for United States Patent 2,210,846, and Aghnides' Oath executed and sworn to by him in the United States on May 7, 1947 for Canadian Patent 490,112, are in direct conflict.

In the United States Patent Oath he says the invention is described in a Belgian application of 1934.

In the Canadian Patent Oath he omits any reference to the Belgian application of 1934. Aghnides' omission is not an oversight, but an intentional one because he states in the Amendment of May 5, 1951 that:

> ". . . the said Belgian 1934 application *did not* disclose fully the bubbly-stream principle disclosed in Holland, Sweden, the United States patent No. 2,210,-846, the instant Canadian case and British Specification No. 625,084." (Emphasis Aghnides)

Aghnides had a duty to act fairly and without fraud and should have advised this Court as to the controversy in issue, and no one will deny that the Belgian and British patents, their disclosures, and the date of invention of Patent No. 2,210,846 were, in fact, the very heart of this controversy.

(133):

The decision by the Supreme Court of the United States in Precision Instrument Mfg. Co. *v.* Automotive Maintenance Machinery Co., 65 USPQ 133, and 324 US 806, decided April 23, 1945, should be controlling here. The Court said:

"* * * Clearly these are matters concerning far more than the interests of the adverse parties. The possession and assertion of patent rights are 'issues of great moment to the public.' Hazel-Atlas Glass Co. *v.* Hartford-Empire Co., 322 U.S. 238, 246 (61 USPQ 241, 245). See also Mercoid Corp. *v.* Mid-Continent Investment Co., 320 U.S. 661, 665 (60 USPQ 21, 24); Morton Salt Co. *v.* Suppiger Co., *supra;* United States *v.* Masonite Corp., 316 U.S. 265, 278 (53 USPQ 396, 402). A patent by its very nature is affected with a public interest. As recognized by the Constitution, it is a special privilege designed to serve the public purpose of promoting the 'Progress of Science and Useful Arts.' At the same time, a patent is an exception to the general rule against monopolies and to the right to access to a free and open market. The far-reaching social and economic consequences of a patent, therefore, give the public a paramount interest in seeing *that patent monopolies spring from backgrounds free from fraud or other inequitable conduct and that such monopolies are kept within their legitimate scope.* The facts of this case must accordingly be measured by both public and private standards of equity. * * *"

(Emphasis ours.)

SUMMARY

The Oaths in the United States Patent 2,210,846 and Canadian Patent 490,112 are in direct conflict as to the earliest date of invention for the identical five claims. Aghnides has testified before this Court that his United States Patent 2,210,846, Belgium Patent 406,702, and

(134):

British Patent 468,687 are one and the same invention. Aghnides' Oath for his Canadian Patent was executed in the United States, and in that application he has sworn

to the Canadian Patent Office that his United States Patent 2,210,846, Canadian Patent 490,112, and British Patent 625,084 are one and the same invention, and indeed, the claims of the United States and Canadian patents are identical. But Aghnides has further sworn in Canada that his Belgium Patent 406,702 and British Patent 468,687 are a *different* invention from that of his United States Patent 2,210,846 and Canadian Patent 490,112—*directly contrary to his sworn testimony before this Court.*

Further, the drawings of Aghnides' Canadian Patent 490,112 and British Patent 625,084 are *identical* and are held out in Canada to be one and the same invention. Aghnides in Canada has stated he proved to the British Patent Office that his British Patent 468,687 and British Patent 625,084 are *different* inventions. It is believed that Aghnides himself was personally present and made a demonstration to the British Patent Office.

Aghnides states that his Dutch Patent 65,293 is for the same invention as his United States Patent 2,210,846. In the Dutch Patent 65,293 he states the invention to be different from his French Patent 800,069, although the draw-

(135):

ings of French Patent 800,069 and the drawings of the abandoned United States application relied on as a basis for the claims of the United States Patent 2,210,846 *are identical.*

Aghnides tells this Court that the abandoned application Serial No. 52,923 drawings are for the same invention as claimed in his United States Patent 2,210,846. He tells the Canadian Patent Office and the Dutch Patent Office that a drawing identical to the United States abandoned application is not for the same invention.

Aghnides for the same invention has different dates of invention—either 1934 or 1937.

Aghnides, in countries other than the United States states that his invention date for the five claims of his United States Patent 2,210,846 is December 1937.

Aghnides, before this Court in the instant case, and in the Meyer's case, and in the Chicago suit, has claimed the Belgian Patent filing date of December 1934 as his date of invention.

Clearly, Aghnides has been false either before this Court or before the Canadian, British, and Dutch Patent Offices. If the basic issue of date of invention in this case has not (136):

been steeped in perjury, then there has been a total failure to disclose to this Court *knowledge of perjury* as to the identical basic issue of date of invention in Canada and Great Britain and the Netherlands.

There are attached hereto two brief charts illustrating graphically the different and conflicting positions that Aghnides has taken with respect to the various patents here involved.

There is filed herewith a certified copy of the file wrapper of Aghnides Canadian Patent 490,112 duly attested to by the Consul of the United States. The Amendments of May 5, 1951 and October 28, 1952 have been tabbed for ready reference. A copy of said Canadian Patent is included herewith.

There is filed herewith a photostatic copy of Aghnides' Dutch Patent 65,299 and an English translation thereof.

CONCLUSION

The directly contrary Oaths in the United States and Canadian patents for the identical claims should alone be sufficient to justify reopening this case so that the undisclosed facts, peculiarly within the knowledge of Aghnides and withheld by him, as well as those facts already disclosed, relating to the heart of this controversy—Aghnides' (137):

earliest date of invention—will all be before this Court.

The case should be reopened because Plaintiffs seek equitable relief, and Plaintiffs' witness, Aghnides, should have acted fairly and frankly and without fraud or deceit as to the controversy in issue.

The case should be reopened to introduce additional proofs showing that Aghnides' earliest invention date as to United States Patent 2,210,846 is December of 1937, and that his own Belgian Patent 406,702, having issued more than two years prior to the filing date of Patent 2,210,846, and his British Patent 468,687, and French Patent 800,069, having issued prior to the filing date of Patent 2,210,846, are pertinent references.

The case should be reopened because it relates to Patents, something that is of great moment to the Public at large, and the Court is entitled to have *all the facts*.

Respectfully,

January 24, 1956 Norman Block
Attorney for S. H. Kress & Co.

(231):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

ORDER DENYING MOTION TO REOPEN CASE.

The defendant filed a motion on January 26, 1956 to reopen this case for the admission of evidence chiefly for the purpose of showing that Aghnides made statements in the Canadian Patent office which contradict the evidence that he gave in this trial. The plaintiff has filed a brief in opposition to the granting of the motion. This court has carefully considered the motion, the briefs submitted by the defendant and the briefs submitted by the plaintiff and is of the opinion that the court ought not grant the motion to reopen the case.

The court assumes that the granting or the denial of the motion is in the sound discretion of the court. Marconi Wireless Co. *v.* U.S., 320 U.S. 1 at page 47 and 48.

The history of the case affords ample reasons for refusing any further delay for the purpose of taking additional evidence. A brief resume is necessary to show some of the reasons why it should not be longer delayed.

The complaint was filed May 13, 1954, the first answer on July 6th which pleads as a defense the decision of the 7th Circuit of Aghnides *v.* Goodrie, 210 Fed. 2d. 859 decided February 24, 1954. The trial in that case appears to have been instituted on November 15, 1951 which involved a patent in suit No. 2,219,846. The defendant in the instant case in paragraph 15 of its answer pleads prior art by specific reference to 2 United States Patents and 5 foreign patents and concludes his answer to that paragraph with these words "and in other patents and publications for which defendant is diligently searching and prays leave to add when found".

On December 6, 1954, it conducted an extensive examination by way of deposition of the plaintiff in New York in which the plaintiff disclosed that he had filed application for patents in England, France and Canada and other countries named based on his Belgium Patent. The defendant and his counsel have had since the 6th of December, 1954 to examine the File Wrappers in each of the countries where the plaintiff applied for a patent based on the Belgium Patent.

(232):

On December 21, 1954, the firm of Bair, Freeman and Molinare of Chicago, Ill. became formerly identified with the case with the local law firm of Block, Meyland and Lloyd and filed a motion to strike the answer to the counter-claim and on the same date filed an amendment to the answer setting up 3 additional U.S. Patents.

The trial started January 26, 1955, and on January 28, 1955, Chase, Brass and Copper Co. Inc. became a party plaintiff and adopted as its complaint the one filed by Aghnides.

On February 11, 1955, defendant filed another answer adding 5 U.S. Patents and 2 foreign Patents to the list previously set up in paragraph 15 of the first answer and pleaded conspiracy and anti-trust violations.

During the trial proper in January the defendant cross-examined Aghnides for two days covering 223 pages of testimony. The trial was then continued to a later date to be fixed by the court but the trial judge suffered a heart attack and was unable to resume the trial until October 10, 1955. At this time the defendant announced that it abandoned its counter-claim and the defense of misuse, at which time Aghnides was recalled and the cross-examination continued for more than one-half day. Again on Oct. 12th about one-half day was consumed in still further cross-examination of this witness covering forty-some pages.

One of the attorneys then had a serious illness while the trial was in progress and an adjournment had to be taken until a later date. The court convened on December 6, 1955 and resumed the trial. At this hearing the defendant called Aghnides back to the stand. The examination covered 11 pages and cross-examined him again which covered 12 pages more.

On December 6, 1955 the evidence was closed by both sides and each party was required by the court to submit original briefs and Requests for Findings of Fact and Conclusions of Law and furnish opposing counsel with copies thereof by January 15, 1956 and to file their reply briefs by January 31, 1956.

The defendant by proper diligence had ample opportunity to produce the evidence before the trial closed which

it is now asking this court to reopen the case to hear. The defendant has been represented by exceedingly able counsel, thoroughly skilled not only in patent law, but in general trial work. The court is compelled to hold a lack of diligence on the part of the defendant for not offering to present the evidence.

The main purpose of the motion to reopen the case is to produce the evidence of statements made by Aghnides to the Canadian Patent Office and to impeach or contradict the evidence of Aghnides.

(233):

The extended cross-examinations at different intervals throughout the entire year of 1955 afforded ample opportunity to the defendant to test the veracity and test the worthiness of the witness Aghnides.

It is true that this is not a motion to set aside a judgment or a verdict but I see no substantial reason which interposes any different degree of discretion in the one case from the other. The exercise of the discretion in refusing to set aside the judgment which was alleged to have been procured on perjured evidence, our Circuit ruled that the action on such a motion is in the sound discretion of the court even in a patent case. Horrison *v.* Hoffberger Co., 190 F. 787 (4th cir.). Another case which sustains the action of the trial judge in refusing to grant a new hearing for the purpose of merely impeaching witnesses who testified is English *v.* Nattson, 214 F.2d. 406 (5th cir.). It seems to be well settled that a new trial should not be granted unless the facts discovered are of such a nature that they would probably change the outcome; that they are actually newly discovered and could not have been discovered earlier by proper diligence and are not merely accumulative or impeaching. See also Colonial Book Co. Inc. *v.* Amsco School Publications Inc., 142 F.2d 362 (2d cir.).

There is another reason which warrants a denial of the motion. Already the case has been long delayed due first, to the illness of the judge and then the illness of one of the counsel and there are many other judicial matters pending before the court which demand attention even if it were satisfactory to the parties to spend much more time and delay a final determination of the case. It is not likely that the evidence, if the case were re-opened, would substantially change the views of the court with respect to the credibility of the witness Aghnides.

The court, therefore, in the exercise of its discretion denies the motion to reopen the case and allows the defendant an exception.

This the 14th day of April, 1956.

Johnson J. Hayes,
United States District Judge.

(234):

OPINION:

Hayes, District Judge:

This is a suit to restrain the defendant from infringement of Aghnides Patents Nos. 2210846 and 2316832 and for damages for infringement. The usual defenses are alleged.

Patent 2210846, hereafter referred to as '846, is the basic patent and 2316832, referred to later as '832, is for improvements on '846. The patents are concerned with, and constitute, an attachment to be fastened to a kitchen sink water tap, by a rubber device to slip over the tap or by screwing the metal device into the tap. This attachment is properly called an Aerator. The object of the basic patent was to receive into the aerator through a wire mesh water under pressure which would be divided into

(235):

multiple droplets. As they emerged from the mesh, air from the outside would be drawn into the chamber from air ports or openings in the device. At the bottom of the

chamber, meshes or screens would retard the water from immediately escaping through the outlet, thereby imprisoning multiple bubbles of air in the water bubbles, and by the proper arrangement of the outlet screens, cause the emerging stream to become coherent, soft and splashless. It seems incredible that so much could be accomplished with so small a device which is less than an inch in length and is virtually un-noticeable when affixed to the water tap.

'832 relates to alterations or additions to the basic patent which effect a better mixture of air and water and improve the whiteness, softness, coherence and anti-splash effect on the emerging stream.

This court had these same patents under consideration in an infringement suit by Aghnides *v.* Meyers Co., 117 F. Supp. 839, in which it was decided that the patents were valid and infringed. Since that time, the seventh Circuit Court of Appeals in Aghnides *v.* Goodrie et al., 210 Fed. 2d 859, held '846 invalid; then again in Aghnides *v.* Holden, 226 Fed. 2d. 949 in which it held that its previous decision was not res adjudicata since the defendant was neither a party or privy to the first case. For the reasons and authorities cited in Aghnides *v.* Holden, *Supra*, the previous determinations are not binding in the instant case because the defendant here was not a party to either of the cases.

The instant case has been fully and capably contested every step of the way throughout a lengthy trial at different intervals during 1955; and requests for extensive findings of fact and conclusions of law have been submitted by each side, together with excellent briefs in support of the requests. This court has made a most thorough examination of the evidence, the actual demonstrations of the patented devices and of the prior art and of the arguments of counsel. Due to the determination of the seventh Circuit that '846 was invalid, this court felt constrained to

follow it rather than its own determination in the Myers case if the evidence warranted it. However, with great deference, we are unable to agree and will set forth the reasons why we hold the patents valid and infringed.

There is no evidence which warrants the court in finding that such a device was in use or had been discovered which was designed or intended to aerate water in a kitchen water tap and to cause the emerging stream to be aerated water forming a soft and coherent stream which would not splash upon striking a dish or other object in the sink.

Such a device met a long felt need which is unmistakably established by the wide spread use of plaintiff's aerators. Since the granting of the basic patent of 1940, on application in Dec. 1935, more than 21 million have been made and (236);
sold by plaintiff's licensees. Its universal acceptance by consumers eloquently establishes the novelty and satisfaction of previous need.

The means by which the device accomplishes the desired result had never before been brought together in a combination which remotely approached the solution of the problem which Aghnides solved so simply. The central portion of the little device is treated as a chamber. The stream of water from a faucet under ordinary pressure is split into multiple units by the insertion of a screen or screens in the upper part of the device. There are openings or ports in the upper part of the device which permits air to be drawn into the chamber and in such a manner that water in no wise escapes through these openings, although the water is detained in the chamber where it envelops small air bubbles. This is accomplished by the insertion of a screen or screens at the outlet of the device in such a manner that the water remains in the chamber sufficiently to envelop air but not to escape out of the air ports, and these outlet screens are so adjusted in relation to the intake

of air and water into the chamber that these multiple droplets of aerated water emerge in a coherent, soft, whitish and splashless stream.

It may be difficult for men to see any useful purpose or novelty here rising to the dignity of invention but it would never be hard for the housewife to see it unless she has an automatic dish washing machine.

It is difficult to ignore the valuation placed on the device in the commercial world. Business concerns are quick to discover and to acquire the rights to use gadgets and devices which give promise of commercial success. Why would reputable concerns like Chase Brass and Copper Co., Firestone Tire and Rubber Co., and Chicago Faucet Co., pay royalties to manufacture and sell 21 million of these aerators if they doubted the validity of the patents in suit.

The strongest evidence of validity is the actual demonstration of the device according to the claims of the patents and a similar demonstration of the prior paper patents. A close observance of the demonstrations leaves no lingering doubt here that both patents are valid.

In addition to the above, we cannot ignore that these patents did not emerge from the Patent Office until full consideration by the Board of Appeal. The members are experts in their field and their opinions are not only presumed to be proper but common sense likewise warrants giving great weight to their determination on patentability.

Against this array of evidence and the testimony of Aghnides, we have the paper patents cited by the defense and the testimony of its expert who is of counsel for the defendant and the three judges who of course only decided on the basis of the evidence in the record and demonstration before them.

(237):

Plaintiff's licensee, Chase Brass and Copper Co. Inc., now owner, makes an aerator under the patents in suit

called "Spring-Flo", (pl. Ex. 29), and Chicago Faucet Co. makes the "Soft-Flo" aerator, (Pl. Ex. 30) Firestone Tire and Rubber Co. makes "Velva-Flo" aerator (Pl. Ex. 31). An examination and test made before the court of defendant's Mel-O-Flo aerator, the accused device, (Pl. Ex. 18) and Exhibits 29, 30 and 31 and each embodies the structural features of Patent '846. The structural elements of the accused device in comparison with those of Aghnides is shown by plaintiff's Exhibit 33 which applies Claims 1 and 4 of '846 to the Mel-O-Flo aerator. Actual tests before the court clearly demonstrate that the results obtained by Mel-O-Flo are substantially the same as are obtained by Spring-Flo and Aghnides Fig. 4 (Pl. Ex. 28). Since aerated water emitting in the coherent splashless stream is the goal sought, it is interesting to note that the cubic inches of air added to each cubic inch of water are as follows:

Spring-Flo	6.0
Aghnides Fig. 4	4.3
Mel-O-Flo	5.1

The same tests also show the vast difference between the above devices and the prior art. Felten, which is the nearest and strongest and the one relied on for invalidity in the Aghnides *v.* Goodrie, *Supra,* furnishes only .7 inch of air to each cubic inch of water.

The accused device is an embodiment of Aghnides invention and utilizes substantially the same elements and the same mode of operations to accomplish the same result.

Defendant's Mel-O-Flo aerator has the second up stream diaphragm of Patent '832 and when used with the adaptor with which it is sold embodies both the second up stream diaphragm and the restricted up stream orifice of Patent '832. The two charts (Pl. Exs. 35 and 37) applying Claims 2 and 4 of Aghnides '832 to the structural element of the Mel-O-Flo aerator show the correspondence of those structures to the elements of Aghnides claim. Mel-O-Flo em-

bodies the Aghnides invention in Patent '832 and the same or equivalent element accomplish the same result in substantially the same way.

There was an utter lack of proof to show that any device existed prior to the Aghnides invention which embodied the combination of elements operating in accordance with his mode of operation and producing comparable results.

Felten as shown above did not produce aerated water. He did not seek that result. He was endeavoring to provide a vacuum pump. This necessitated the flooding of the chamber to create vacuum, the exact opposite of Aghnides Patents in suit. He did not obtain aerated water, nor a coherent, splashless stream. There is nothing in Felten to indicate he was concerned at all in these results. This (238):

applies to Aghnides 1,912,113, and to Fuss Patent 1,090,044.

Battersby British Patent No. 323,242 of 1929 and Solomon British Patent No. 405316 of 1934 are similar in that they produce a violent, splashing, divergent stream without the necessary aeration. They are clearly for a different purpose and operate on principles inapplicable to the Aghnides patents in suit. The ingenious defense is urged that one skilled in the art could appropriate some of the teachings of Felten with some of those disclosed in Battersby and Solomon and then take some of the teachings of Viellard British Patent 12, 345 of 1898 and Purser British Patent No. 136,663 of 1919 and produce the same results as did Aghnides. Here, however, none of the prior art seemed to have been interested in aerating water in the kitchen tap in order to cause it to emerge in a coherent, bubbly, soft splashless stream. They did not see the problem, did not undertake its solution, and not one nor all of the prior art became the equivalent of Aghnides and it required inven-

tion to combine the old principles into the new and useful result found in the patent in suit. Holtke *v.* C.M. Kemp Mfg. Co. 4 cir., 80 Fed. 2d. 912; Colgate Palm Olive *v.* Carter Products, Inc. No. 7075, decided March 8, 1956, ... Fed. 2d .....

If Aghnides had done nothing more than make a true combination in which old elements were combined to produce a new and useful result it constituted invention and he is entitled to protection against infringement. Numerous citations from this Circuit could be added, but the two cases cited above and Reynolds *v.* Whitin Machine Co., 167 Fed. 2d 78 cover every phase of this case in regard to patentability, prior art and infringement.

The improvement patent '832 was allowed over the basic patent '846 by the Board of Appeals in the Patent Office. The demonstrations of the device constructed according to the disclosure of '832 in comparison with the prior art convincingly show that invention beyond the skill of the art at that time was required. Defendant has not established anticipation of '832 or that the ordinary skill of the art could create the improved combination of this patent.

The application for patent '832 was filed April 5, 1940. The defendant contends that Chicago Faucet Co. offered for sale the device embodying the patent more than two years before the filing of the application. Aghnides made the invention and arranged with Chicago Faucet Co. to (239):

manufacture it as his licensee but before it was to be put on the market a sample was to be submitted to Aghnides for his approval. Due to an advertisement in Domestic Engineering, March, 1938, by Chicago Faucet Co., it is urged that this constituted an offer for sale. The evidence shows the aerator was not assembled until April 14, 1938, at which time a sample was sent to Aghnides for his approval

and there were no sales of such aerators until May, 1938. It was not on sale or sold prior to two years before the application was filed.

The accused device Mel-O-Flo sold by the defendant was manufactured by Melard Manufacturing Co. When the summons and complaint in this case was received in defandant's main office in New York, it was forwarded by Mr. Gueber, its chief counsel, to Melard Manufacturing Company, under date of May 20, 1954, with the following request: "In as much as we purchase 'Mel-O-Flo Jet Aerators' from you we look to you solely to take over the defense of this action and save us harmless from any and all loss, cost, damage and expense which may arise therefrom." On May 21, 1954, Melard wrote Mr. Guerber acknowledging receipt and said: "We have forwarded above to our attorneys, and shall contact you upon hearing from them." At the request of Block, Meyland and Lloyd, time for filing answer was extended June 2, 1954 to July 6, 1954. The answer was filed on that date signed by the same attorneys but who were not employed by S. H. Kress and Co. The answer pleads invalidity, non-infringement and the prior adjudication in Aghnides *v.* Goodrie, 210 Fed. 2d. 859, and contains a counter-claim for a declaratory judgment declaring both patents invalid and void and non-infringement by defendant.

On October 7, 1954, plaintiff served interrogatories on Block, Meyland and Lloyd. On Oct. 19, 1954 Mr. Lettvin of the firm of Bair, Freeman and Molinare of Chicago visited Mr. Guerber in connection with answering the interrogatories. Melard Manufacturing Co. had assumed and actually conducted the entire defense through its patent attorneys above named without Kress knowing who they were or what they were doing. Plaintiff took the depositions of the officers of Melard Manufacturing Company and

of S. H. Kress and Co., including counsel, but by objecting in behalf of Melard that communications between it and counsel were privileged and in the same manner as to communications between Kress and counsel, succeeded in withholding the details of what occurred on Oct. 19th and thereafter except when depositions of Melard officers were taken Bair, Freeman and Molinare were entered as attorneys for Melard and they were listed also attorneys for Kress. On Nov. 2, 1954, Melard delivered to Kress this letter:

(240):

Ex. 2. November 2nd, 1954.

S. H. Kress & Co.
114 Fifth Avenue
New York, 11, N.Y.

Att. Mr. Gerber

Gentlemen:

Be advised that Melard Manufacturing Corporation will and does indemnify S. H. Kress & Company against all claims in the United States arising from charges of patent infringement as a result of Kress' sale of Mel-O-Flo Aerators.

Very truly yours
Melard Manufacturing Co.
Signed
Sidney J. Shames
President.

Kress answers the Interrogatories Nov. 8, 1954, notwithstanding the above letter, the answers to the Interrogatories, its answer to No. 17 is: "No knowledge, but neither Melard Manufacturing Corp. nor any attorneys acting on behalf of Melard Manufacturing Corporation have agreed with S. H. Kress and Company to aid in or contribute toward the defense of this action in the future."

The depositions, especially of Guerber, indicate that Lettvin interviewed Guerber in connection with, and assisted in, preparing answers to the Interrogatories and at that time some kind of arrangement was effected between the attorneys for Melard and defendant Kress whereby as of October 19, 1954 Baer, Freeman and Molinare would represent Kress. The details were not disclosed due to objections by Lettvin that all that information was privileged.

By leave of court Chase Brass and Copper Co., Inc., became a party as assignee and filed its Complaint January 28, 1955, adopting the original Complaint of Aghnides. The trial began January 26, 1955 and continued through January 28, recessing to a later date. Defendant filed an answer Feb. 11, 1955, reasserting the defenses of its original answer and pleaded a Counter Claim for Misuse and Anti-Trust violation and for damages. At the resumption of trial on October 10, 1955, Mr. Freeman announced the abandonment of the defense of Misuse and its Counterclaim for violation of the Anti-Trust laws. On October 12, 1955, Mr. Freeman stated that he never would have with-
(241):
drawn his Misuse defense or abandoned the Counter Claim for Anti-Trust violation if he had not been directed to do so by general counsel for Kress. At that time he admitted his firm was being paid by Melard Manufacturing Company.

It is the contention of the defendant that Melard Manufacturing Company was not a party to the suit and that no issues are raised which warrant a finding in relation thereto, relying on Minneapolis Honeywell Regulator Co. *v.* Thermoco, Inc., 116 Fed. 2d 845. It is there stated: "Obviously it was not necessary to the decision of any of these issues to decide who was defending the action." This is in conflict with the rule in the Third and Fourth Circuit Courts of Appeals. Caterpillar Tractor Co. *v.* Interna-

tional Harvester Co., 120 Fed. 2d. 82. (3rd cir.), 139 A.L.R. 1 and extensive note beginning at page 9; E. I. Dupont DeNemours and Co. *v.* Sylvania Industrial Corporation, 4th cir. 122 Fed. 2d 400; Aetna Casualty and Surety Co. *v.* Abbott, 4th cir., 130 Fed. 2d. 40, at 42. In the latter case the court said:

> "The defense that the gold certificates were possessed by plaintiff in violation of law was asserted and fully passed on in the suit against the Takoma Park Bank, in which the judgment sued on was obtained, and which was admittedly defended by defendant under its policy. It is too well settled to admit of discussion that on such a question the defendant is concluded by the judgment. The defendant, by defending the action, bound itself by the judgment to the same extent as though a party to the record. E. I. DuPont De Nemours and Co. *v.* Sylvania I. Corp., 4 cir., 122 Fed. 2d 400, 404; Lovejoy *v.* Murray, 3 Wall. 1, 18 L.Ed. 129. And as said by this court in National Bondholders Corp. *v.* Seaboard Citizens Nat. Bank, 4 Cir., 110 F. 2d 138, 143: "It is well settled that a fact or question which was actually and directly in issue in a former suit, and was there judicially determined by a court of competent jurisdiction, is conclusively settled by the judgment therein so far as concerns the parties to that action and persons in privity with them, and cannot be again litigated in any further action between the parties or privies in the same or any other court upon either the same or a different cause of action."

In Davis Company *v.* Baker-Cammack, 86 Fed. Supp. 180, 4 cir., 181 Fed. 2d. 550, there were 167 hosiery manufacturers, not nominal parties to the record, but companies

who contributed to the fund to pay counsel for defending the patent infringement suit. The judgment was applied to each contributor as to validity of the patent and each was enjoined against infringement of the patents in suit. (242):

Hence, both by the great weight of authority and specifically under the law of this circuit, Melard Manufacturing Co. having conducted the defense for Kress and for itself as fully and completely as it could have done if it had been a party, is bound by the judgment against Kress, especially as to the validity of the patents in suit and their infringement by the Mel-O-Flo device sold by Kress and manufactured by Melard Manufacturing Company. It is true that Kress, for reasons not disclosed to the court, decided to abandon the Counter Claim for damages on its plea of Anti-Trust violation, but there is nothing to show that Melard elected to decline to defend the suit because of Kress' abandoning the Counter Claim and defense of Misuse. It is not material whether Melard defended for Kress in discharge of Melard's duty to do so under its agreement with Kress or to protect itself from a judgment in favor of Aghnides. The fact remains that it conducted the defense and is bound by the judgment against Kress.

Let a decree be entered according to the views herein expressed.

This the 4 day of May, 1956.

Johnson J. Hayes
United States District Judge.

(243):
Messrs. Ely, Frye and Hamilton
Akron, Ohio.

Pennie, Edmonds, Morton, Barrows
and Taylor,
214 Park Avenue
New York City, N.Y.

Messrs. Brooks, McLendon Brim and Holderness
Greensboro, N. C.
and
Messrs. Bair, Freeman and Molinare
135 S. LaSalle St.
Chicago, Ill.
Messrs. Block, Meyland and Lloyd
Greensboro, N. C.

RE: *Aghnides* v. *Kress*—857-G.

Gentleman:

I have just completed two weeks of work reviewing the evidence and studying the briefs in this case. I have adopted the findings of fact and conclusions of law submitted by the plaintiff and made an entry allowing the defendant exceptions to each finding of fact and conclusion of law and also an exception to the refusal to find the facts and make the conclusions of law as requested by the defendant.

Plaintiff's counsel should prepare and submit to the court a decree based upon the findings of fact and conclusions of law said the opinion filed by the Court, a copy of which is enclosed. I would like for the decree to be available for my signature at Rule Day in Greensboro on May 18th.

Johnson J. Hayes

(244):

IN THE UNITED STATES DISTRICT COURT

* * (Caption—Civil Action No. 857-G) * *

DECREE

The trial of this action having been had before the Court, and the Court having considered the evidence, the exhibits, the record and all the papers and proceedings had herein, and the Court having made and filed its Opinion, dated May 4, 1956, and its Findings of Fact and Conclusions of Law, dated May 4, 1956, which are made a part hereof by references, it is hereby

ORDERED, ADJUDGED and DECREED:

1. United States Patent No. 2,210,846 granted August 6, 1940, to plaintiff, Elie P. Aghnides, is good and valid in law as to all of the claims thereof.

2. United States Patent No. 2,316,832 granted April 20, 1943, to plaintiff Elie P. Aghnides, is good and valid in law as to all of the claims thereof.

3. Plaintiffs are entitled to the relief herein granted.

(245):

4. The defendant, S. H. Kress & Company, has infringed upon said patents and both of them by the sale in this district, prior to the filing of the Complaint, of aerators known as "Mel-O-Flo" aerators, manufactured by Melard Manufacturing Corporation, of New York, New York, which said "Mel-O-Flo" aerators infringe all of the claims of each of said patents Nos. 2,210,846 and 2,316,832.

5. As will appear by reference to the Court's Findings of Fact and Conclusions of Law, dated May 4, 1956, which are incorporated herein, the conduct of the case and defense thereof was in fact undertaken, controlled and directed by Melard Manufacturing Corporation, and said Melard Manufacturing Corporation is and shall be bound by this Decree in all respects the same as the defendant, S. H. Kress & Company.

6. That the defendant, S. H. Kress & Company, and Melard Manufacturing Corporation, their officers, agents, servants, employees and attorneys and those persons in active concert of participation with them, who receive actual notice of this Decree and Injunction by personal service or otherwise, be and they are hereby perpetually restrained and enjoined from manufacturing, using or selling said "Mel-O-Flo" aerators or other aerators embodying the invention of patent Nos. 2,210,846 and 2,316,832, or from directly or indirectly infringing said patents or from in any way infringing both the rights of plaintiffs, Elie P. Aghnides and Chase Brass & Copper Co., Inc., under said patents, or either of them, during the life of said patents, respectively.

7. Damages to the extent of One Dollar ($1.00) are awarded in this action to the plaintiffs by reason of the infringement of defendant, S. H. Kress & Company, of the said patents.

8. Plaintiffs are hereby awarded costs in this action to be taxed by the Clerk of the Court.

(246):

The defendant having withdrawn in open court the affirmative defenses set forth in paragraphs IV, V and VI, and the counterclaims set forth in paragraphs VII and VIII of defendant's Second Answer, filed herein February 11, 1955, and, it is

FURTHER ORDERED, ADJUDGED and DECREED:

9. That said affirmative defenses and counterclaim be and the same hereby are dismissed with prejudice, and defendants exhibits 4-13 inclusive, relating thereto, be and the same hereby are stricken from the record.

This the 22 day of May, 1956.

(s) *Johnson J. Hayes*
United States District Judge

(247):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

The Court having made its findings of fact and conclusions of law, and mailed copies thereof to counsel representing the defendant, and having appointed this day as the date for entry of decree, pursuant to the findings of fact and conclusions of law, at this time the Court orders that the defendant be and he is hereby allowed and exception to the refusal of the Court to make each finding of fact in accordance with the request submitted, and exception to each refusal to make the conclusions of law as requested by defendant, and also allows an exception to the defendant for each finding of fact which the Court did make and each conclusion of law, and to the decree which is entered.

At Greensboro, this May 22, 1956.

(signed) *Johnson J. Hayes*
United States Judge

(248):

IN THE UNITED STATES DISTRICT COURT

• • (Caption—Civil Action No. 857-G) • •

NOTICE OF APPEAL

Notice is hereby given under Rule 73, FRCP, that S. H. Kress & Company, Defendant above named, hereby appeals to the Court of Appeals for the Fourth Circuit from the Order Denying Motion to Reopen Case dated April

14, 1956, and from the Decree entered by the Court in this action on May 22, 1956, and from the whole thereof.

Norman Block
Block, Meyland and Lloyd
Greensboro, North Carolina

Will Freeman
Bair, Freeman & Molinare
135 South LaSalle Street
Chicago 3, Illinois
Attorneys for Defendant
S. H. Kress & Company

Dated: June 19, 1956.

PROCEEDINGS

• • • •

(Tr. 39):

ELIE P. AGHNIDES, the plaintiff, being first duly sworn, testified as follows:

DIRECT EXAMINATION.

By Mr. Ely:

• • •

(Tr. 83):

The Witness: At the upstream end of this device, the Mel-O-Flo, there is a diaphragm with small orifices through which the water from the faucet goes, is delivered, and below the diaphragm there is a casing with lateral holes for the admission of air, and below those lateral orifices for the admission of air there is a resistance formed by the screen, so that the performance of this aerator is the delivery of naked streams in an open chamber to receive free atmospheric air and then to strike the inner walls of the casing and then further break up at the screen at the discharge end of the device and emerge as a coherent, bubbly stream.

(Tr. 84):

Q. (By Mr. Ely): Suppose we come down to the chart, Plaintiff's Exhibit 33, and, if you will take the pointer and take the article along with you too, will you please show to the Court first the various elements—

The Court: Wait just a minute before he gets on to that. You have not described this diaphragm.

The Witness: Yes. This diaphragm here is formed by a ring and the plate that is seated in that ring. The plate is provided with teeth so that when the plate is seated in that ring the space between the teeth and the ring forms openings through which the water goes with high velocity.

The Court: But the piece itself is not perforated like the screen (diaphragm?) in yours?

The Witness: No.

The Court: It has openings around the border of the piece through which the water can escape downward?

The Witness: When the parts are hooked together, then we have perforations formed by the division of two parts.

* * * *

(Tr. 116):

CROSS EXAMINATION.

(Tr. 134):

Q. Do you have a copy of the Felten patent which you referred to yesterday in your direct examination?

Mr. Ely: It is an exhibit, isn't it?

Mr. Brooks: It is Exhibit 24.

(Tr. 136):

Q. Isn't it a fact that the water passes through the aperture or opening C?

(Tr. 137):

A. Yes, it is.

Q. And that the diameter of opening C is substantially less than even the upper end of the chamber E; is that

correct?

A. It has to be less, of course.

Q. So that that jet, which is defined as to its cross section area by the opening C, moves downwardly, in the downstream direction; is that correct?

A. Yes, sir, it goes into the narrow throat.

Q. And, as a result of that jet moving downwardly, air is sucked in through the orifice D in the side of the member?

A. Yes, sir.

• • •

(Tr. 138):

Q. Now Felten shows an internally screw-threaded member at its upper end, which is marked with reference (Tr. 139):
letter B, and that is for securing to a tap or some threaded connection; correct?

A. I believe so.

Q. You have read the specifications?

A. I believe so. I see so there, and the specification says.

Q. In Felten there is a discharge end directly below the threaded portion B which is referred to by the reference letter G; correct?

A. Yes.

Q. What discharges through the opening within the member G in Felten?

A. When it is operating as Felten describes it, it discharges water containing a little ozone for sterilizing the water.

Q. That ozone includes air, does it not?

A. It says so, yes.

Q. So that out through the opening in the member G at the lower end you get a discharge of air and water, or ozone containing air and water?

A. Yes.

Q. Now between the orifice C by which a jet of water is formed and the discharge opening in the member G do you find any obstructions that will offer resistance to the (Tr. 140):
flow of water before it is discharged to free atmosphere?

A. Yes, I find the mixing means Felten is referring to, as shown by letter F.

Q. Now the members F are in stacked relationship, one above another; correct?

A. So says the patent.

Q. And those members F are each arranged with some openings and some plain or solid portions; correct?

A. Correct.

Q. So that the cross section at the lower end of the fitting provides an obstruction clear across, which obstruction has a certain number of openings in it; correct?

A. Yes.

Q. And is it true that the water and air that enters into the chamber E must take a circuitous path before it is discharged through the opening in the member G, circuitous meaning a zigzag or erratic course?

A. Yes. May I, with your permission, complete my previous reply?

Q. Certainly. I thought you were through. You just go ahead and amplify as much as you like.

A. You asked me if the water—could I have that question again, please, the previous question?
(Tr. 140a):

The Court: Read the question and his answer.

(Record read by the reporter, as follows:

"Q. So that the cross section at the lower end of the fitting provides an obstruction clear across, which obstruction has a certain number of openings in it; correct?

"A. Yes")

The Witness: I would like to complete. That member is followed by coupling G, which has a smaller diameter than the diameter of the member upstream of the coupling G.

Q. That member is member F?

A. Yes, member F.

Q. In other words, are you making a point of the fact that the opening in the member G is contracted or smaller than the overall area of the members F?

A. I am not saying that that opening, the total open orifice of G, is smaller than the total opening of member F. I did not say that, but I said that the diameter of the coupling G at the lower end of the device is smaller, as one can see in the drawing, then the diameter of disc F.

• • •

(Tr. 146):

Q. Now we will come back to the Felten patent. Yesterday you described that patent on direct examination as being a vacuum pump?

A. Yes.

Q. And I am going to ask you if you find anything in any of the words in that patent that uses the term "vacuum pump".

A. I believe it says somewhere that it is an injector—here it is, page 1, lines 23, 24: "The body A of the mixing apparatus, which of course could also consist of several parts, serves as an injector." Injectors and vacuum pumps are equivalent terms.

Q. In other words, the term injector, as used in the description of the Felten British patent, denotes to you a pump, a vacuum pump?

A. Yes, sir, because it operates also exactly like a vacuum pump.

Q. Now that phrase that you just read refers to the body of the mixing apparatus serving as an injector; correct?

A. Yes, the body A of the mixing apparatus.

Q. So that I definitely understand you, the use of the term injector in the description of the device of Felten denotes to you a vacuum pump; correct?

A. The Felten apparatus denotes to me a vacuum pump, because vacuum pump is equivalent to injector in the scientific language.

(Tr. 147):

• • •

(Tr. 151):

Q. (By Mr. Freeman): Now, Mr. Aghnides, will you turn to your first patent, number 2,210,846 and tell me which figure is closest to the Firestone commercial product?

A. I would say Figure 1.

Q. And which one to the Chase—the same question with respect to Chase?

A. Figure 4.

(Tr. 152):

Q. And which one to Chicago Faucet?

A. Figure 4.

• • •

(Tr. 154):

Q. (By Mr. Freeman): Now will you turn to line 31, column 2, page 2, wherein you describe the operation of Figure 8, and do you not there find—and I now quote:

"As in preceding examples, the fluid under pressure courses through passages 74 and draws fluids from inlet ports 76 and 77 into the enlarged portion of passages 74. Baffles 78 project into the passages at the point where the passages discharge into the mixing chamber. The baffles in part interrupt the course

of the fluids in each passage and thereby serve to effect a preliminary mixing of the fluids. Within the mixing chamber two screens 80 in spaced relation are placed across the path of the fluids emerging from the passages 74 to interrupt abruptly the course of all such fluids and thereby cause the fluids to mix and sub-divide into minute particles. The fluids are discharged through the outlet 82."

Now I will ask you if that is a correct description of Figure 8?

A. I believe it is, yes.

Q. The difference between Figure 8, in so far as the openings on the side, is that one takes in one type of gas and the other one takes in another type of gas; is that correct?

A. Gas, liquid, fluid.

Q. Well, air is fluid, is it not?

A. Yes, air is fluid too.

Q. And is it true that that device could be used so that the same fluid would come in through both of the openings which project laterally from the sides?

A. If you decide to do so, it could be, yes.

(Tr. 156):

Q. And those openings could be left open to atmosphere, as shown in Figure 8, and you could draw in air?

A. They are not intended to be, but you might leave them open and draw air.

Q. Are they intended to be connected to some container or space?

A. Yes.

Q. And is it true that, when connected to some container or space, the structure of Figure 8 would serve as an exhaustor?

A. As a vacuum, as an exhaustor, as an injector.

Q. In other words, it would draw air out from the encompassed space or container and that air would be drawn as a result of the water passing through the orifices in the form of jets; correct?

A. Yes.

Q. And it is likewise true, is it not, that in the course of the jets they would be initially broken up as they passed downwardly in the openings 74; correct?

A. Initially broken up where? I don't follow you there. Opening 74 is the conical channel, isn't it?

Q. 74 is the conical conduit or passageway?

A. Yes.

Q. Isn't it true that as the liquid and air—and at (Tr. 157):
that time the liquid is in the form of a jet surrounded by air?

A. If you admitted air, yes.

Q. If you opened it to atmosphere, or using it as an exhaustor, air and water would pass through the opening 74 in a downward direction; correct?

A. Yes, that's correct.

Q. And that air and water would then strike against inwardly extending baffles which extend from the walls?

A. They would be stymied there and flood the channel, yes.

Q. And, as a result of that initial breakup brought about by the baffles 78, the liquid would then go on down into chamber 72?

A. Yes.

Q. And pass out through two spaced screens; correct?

A. Right.

Q. And likewise through the restricted orifice 82 in the lower end of the unit?

A. Yes.

Q. Now Figure 8 operates, does it not, on the same phenomenon or principle that we find in your Figure 6?

A. It does not.

Q. It is different?

A. It is different.

(Tr. 158):

Q. Is it a different invention?

A. It is no invention. Figure 8 is no invention; it is a known thing.

• • • •

(Tr. 175):

Q. Now, with respect to Figure 6, what figure, if any, in the abandoned application corresponds to it?

A. There is none, but, in principle, it is the same because—

Mr. Freeman: I move that the last portion be stricken as not responsive.

The Court: Overruled; exception. He has answered and can make any explanation necessary to clarify it. Go ahead.

The Witness: I said in principle, the principle being to break the water against obstacles and baffles and screens. The construction exactly as shown in Figure 6 of the patent does not exist in the abandoned application, but the equivalents, they certainly do.

Mr. Freeman: I object to that term, "equivalent". That is for the Court to find.

The Court: He is merely expressing his opinion. I will reserve the right to pass on that.

• • •

(Tr. 176):

Q. (By Mr. Freeman): And you do not find any figure in your Belgian application or patent corresponding to Figure 6 of your U. S. patent; correct?

A. The answer is the same as before.

Q. When you say the same as before, the same as with respect to Figure 5?

A. Yes; in other words, the equivalent, but not exactly the same.

• • •

Q. Now will you look at your first patent in suit and tell me which one of the seven different forms or arrangements there shown corresponds the closest to the structure here charged to infringe?

A. I would say Figure 6. I would add that it infringes all the forms of my aerators, but it is closer to Figure 6.

• • •

(Tr. 178):

Mr. Freeman: I'd like to offer in evidence as Defendant's Exhibit 14 a copy of British patent number 468,687, (Tr. 179):

issued to Aghnides, the plaintiff here, and I offer it on the basis that it was referred to in the file wrapper which was offered yesterday by the plaintiff, Exhibit 16, and it is a part thereof. It is sometimes called "the contents."

Mr. Ely: What is that?

Mr. Freeman: That is the British patent that corresponds to the patent here in suit.

Mr. Ely: That isn't prior art. I object to that.

Mr. Freeman: I don't offer it as prior art. I offer it as one of the patents referred to in the file wrapper that you offered yesterday and which is referred to on page 34 of Exhibit 16, under date of November 17, 1938.

Mr. Ely: I certainly don't see the purpose of that, Your Honor. This man's British patent is on file within the date of the convention. I don't see what it's all about.

Mr. Freeman: I didn't tell you what it was all about. I said I offered it because it was referred to, and I was going to go into it. I haven't yet stated why.

Mr. Ely: I object to it as immaterial and irrelevant.

The Court: I will overrule your objection now. Go on and let's see what it is. Does this have substantially the same drawing on it as the patent applied for in Belgium?

Mr. Freeman: It is almost the same; it's not quite the same.

(Tr. 180):

(The patent referred to was received in evidence as Defendant's Exhibit 14.)

Q. (By Mr. Freeman): Mr. Aghnides, this morning when I asked you about the Felten patent and you criticized it as being an injector and that therefore it differed from an aerator—do you remember that?

A. I said it is a vacuum-producing device, yes, and I said generally I applied the term injector also to vacuum pumps.

Q. And because of the use by the patentee of the Felten patent of the term "injector," you then said that meant to you a vacuum pump; is that correct?

A. Not merely because of the use of the word; because of the structure that is shown in the device, in the drawings of the patent.

Q. That is a little different from what I understood you to say, but I will accept that for the moment.

A. I did say they used also the term "injectors" for vacuum pumps.

Q. And do you use the term "injector" in connection with aerators?

A. I don't, but maybe by mistake it may have been used.

Q. No, I am asking you now whether or not the term "injector" can equally well be used in connection with aerators.

(Tr. 181):

A. It wouldn't be proper.

Q. Now will you look at your British patent, which I have offered as Defendant's Exhibit 14; and I will ask you to read the third paragraph, page 1, beginning with line 11, which explains what your device is.

A. Yes. It says—even though it uses the word "injector portion," it says that is provided upstream of the part where it aspirates air, with a perforated cross partition that divides the stream of liquid into a number of small streams and downstream the said part, with an atomizing and mixing portion comprising one or more finely perforated plates, so that the resulting jet is of substantially uniform pressure throughout its cross section and consists of a uniformly distributed, evenly broken mixture of liquid and air, having the particles of liquid and air in intimate association with each other even after issuing from the said device.

Q. What is the injector portion that is referred to there as part of your invention?

A. In this case it seems the diaphragm it describes as being perforated with several orifices; it refers to that diaphragm.

Q. As an injector?

A. Yes. It is not a good definition of a diaphragm, but it says so.

(Tr. 182):

. . . . . .

(Tr. 184):

Q. Now you don't claim to be the first to pass water under pressure through screens, which screens offer resistance, do you?

A. I do not.

Q. And you do not claim to be the first to contract the lower end of a device that passes air and water through a member?

A. I do not.

Q. Now tell me when you personally began the activity of having a flow of water suck in air, mix the two together, and discharge air and water through an opening (Tr. 185):
to atmosphere.

A. You are asking me at what time?

Q. Yes.

A. Oh, it must have been sometime in 1933, and I applied for my patent in 1934. It might have been the beginning of 1934. I don't know; it's a long time ago.

Q. I am not asking you about what you now call an aerator; you seem to distinguish between the two. I am asking how long ago, when, did you employ the art of having a stream of water passing through a jet or a nozzle for sucking in air, letting the air and water pass into a chamber, and then being discharged to atmosphere.

A. I do not know exactly what you mean, because those water pumps have been doing that business for decades. So when I applied for my own water pump, of which I suppose you have a copy of the patent, it was, I suppose, sometime before 1930—I don't remember exactly—before 1930, and it was designed to create a vacuum.

Q. Now that water pump which you say you worked with sometime in the thirties or thereabouts, that included a diaphragm having a plurality of openings in it; correct?

A. Yes, it did.

Q. And the water under pressure was forced through those openings in the diaphragm; correct?
(Tr. 186):

A. Yes, but each streamlet engaged itself into a narrow throat immediately below the streamlet, so as to flood the chamber and create a vacuum. In other words, those streamlets from the so-called diaphragm, or its equivalent, entered each streamlet into an individual channel which it flooded, and below the channel there was no orifice for air entrance whatsoever.

Q. Now you have talked about flooding the throat in connection with your own patent, Figure 8; correct?

A. Yes.

Q. And is it your position now that Figure 8 of your first patent is what you might call a pump?

A. A vacuum-producing device, yes, a pump.

• • •

(Tr. 187):

Q. In Figure 8 of your patent, the patent in suit, you say that is a pump?

A. That is a pump; that is a vacuum-producing device.

Q. And the rest of the devices, the various six or seven different devices, they are what you call aerators?

(Tr. 188):

A. Exactly.

• • •

(Tr. 196):

Q. I hand you a copy of Aghnides' Patent No. 1,912,113 and I will ask you if that is the water pump that you referred to?

A. Yes, that is one.

Q. And that is adapted to be attached to a faucet?

A. Yes.

Q. A faucet of the kind I hold in my hand, just an ordinary water tap?

A. Just an ordinary faucet.

• • •

(Tr. 197):

Q. (By Mr. Freeman): Do you find in your patent 1,912,113, which we will offer in evidence, so I can identify it further, as Defendant's Exhibit 15, do you find in the structure there shown a mechanism for attachment to the discharge end of an ordinary household faucet?

A. Yes, I do.

(The patent referred to was received in evidence as Defendant's Exhibit 15.)

Q. And do you find a diaphragm extending across that member somewhat below the bottom of the faucet?

A. Yes, there is an equivalent of a diaphragm.

The Court: What number does that bear?

Mr. Freeman: The patent doesn't give it a number, but the diaphragm has four openings through there, which are referred to by the reference numeral "7".

Q. That is true, is it not?

A. "7" with a dot on the top—prime.

Q. Yes, 7, 7', and 7".

(Tr. 198):

A. 7' is below—7".

Q. The diaphragm has no number; however, there are shown openings in the diaphragm which are numbered 7 and 7"; correct?

A. Yes.

Q. And the lower ends of the openings 7 and 7" discharge jets of water into a channel which is smaller at the top than at the bottom, marked with number 7'; is that correct?

A. Not quite. I would say that each streamlet—I would say below each orifice in the so-called diaphragm there is a corresponding individual channel.

Q. And the water passes through those individual channels which are hung on to the bottom of the diaphragm and direct a jet of water into the portion marked 7'; correct?

A. Yes, the water from the orifice 7 goes into the narrow throat or channel 7'.

Q. And with it air is sucked in through the conduit 5; correct?

A. There is some air going through channel 7', yes.

Q. Well, that is a partial answer. The air is sucked in through the opening of the conduit 5?

A. If some air is going it means it is sucked in, yes.

The Court: He asked you if it was sucked in through the conduit 5.

(Tr. 199):

The Witness: Yes, it is.

Q. (By Mr. Freeman): That air and water then moves downwardly at a relatively high velocity because of the pressure of the water of the faucet; is that correct?

A. Yes, but the velocity has already slowed down greatly in that gradually enlarging conical chamber 7', but naturally you still have some velocity in order to flow down.

Q. There is still some velocity?

A. No doubt.

Q. Now the water and air, passing from the channel 7', strikes against the pear-shaped member 8, does it not?

A. It does not strike because, as you will see, the pear-shaped member at a certain point has a diameter very close to the diameter of the outlet end of the device, so that the chamber immediately below that conical channel 7' is flooded, as well as the conical channel 7' so that it really does not strike. The water, with slowed-down velocity, arrives and finds in its path the onion-shaped body 8.

* * *

(Tr. 200):

Q. (By Mr. Freeman): Does that pear-shaped member, on the upper surface, engage the water and air in any fashion?

A. I did not understand the question.

Mr. Freeman: Will you read it?

(Question read by the reporter.)

The Witness: What do you mean by engaging air and water?

Q. (By Mr. Freeman): Does it make contact with it?

A. Certainly, they touch it and go around it.

Q. In the act of touching it and going around it, does it offer any resistance to the downward flow of water before it is discharged through the opening 11?

A. Certainly; enough resistance to flood the chamber above.

Q. So it does offer resistance?

A. Yes, just the resistance required by a water pump.

• • •

(Tr. 203):

Q. The object of the device as shown in Defendant's Exhibit 15 is to take the air out of a container 5, or a container which connects up to the pipe 5?

A. Yes.

Q. And air within that pipe must ultimately be discharged through the opening 11 of the attachment to the faucet; correct?

A. Yes, as much as it can. In other words, if the efficiency of the pump creates a vacuum of eighty percent, there would be left a little air in that chamber. Absolute vacuum is extremely difficult to create, so you create practically total vacuum.

• • •

(Tr. 204):

Q. Will you go along with me that some air and some water has been intermixed and goes out through the opening 11?

A. Yes.

Q. Now you will go along with me that the onion-shaped member 8, or pear-shaped, as it is called in the patent, offers some resistance to the downward flow of

water between the faucet 3 and the discharge opening 11 in the lower end of the device?

A. I would say it offers great resistance.

Q. And that resistance would bring about a mixing of whatever air was entrained with the water with the water; correct?

A. Yes. There is so little air that really mixing does not become a problem because the air, as I was saying this morning, and the water have two specific weights, way apart, the air very light, the water very heavy, the air not soluble in water, so the little amount of air gets out with the water certainly in some mixture.

(Tr. 205):

Q. Whatever amount of air and water comes out collectively from the conduit 7, it is met with a certain resistance brought about by the onion-shaped member 8; is that correct?

A. Yes, some water and some air.

Q. Then below the onion-shaped member we have an enlarged portion which then contracts downwardly and inwardly and defines a relatively small opening 11; correct?

A. Yes.

• • •

(Tr. 208):

Q. Let me ask you was there any function or purpose of contracting the casing at the lower end so that the opening 8 would be smaller in cross sectional area than the overall cross section of the chamber immediately there above, the opening 11?

A. Well, that also to offer additional resistance so that surely the device is flooded above the onion in the channels before it is discharged, to create a piston effect.

Q. In other words, the contracting of the lower end offers resistance to the water that flows out?

A. When you go to such small dimension, yes.

Q. And that resistance is brought about from the sidewalls of the chamber?

A. Yes.

Q. And if I were to put some screens across the discharge opening 11 would that offer additional resistance? (Tr. 209):

A. It would offer additional resistance.

Q. And if I put two screens on I would have still more additional resistance created?

A. You would.

Q. And it is a fact that in this particular patent you so state, that screens may be used?

A. Yes.

Q. And that you find on line 95, page 1, column 2, wherein you state "Preferably the outlet 11 will be provided with a wire gauze acting as an anti-splash device"; correct?

A. Yes, certainly.

Q. And in such case, when using a wire gauze or screen, you then add additional resistance?

A. I do.

Q. Do those screens which you say can be mounted on outlet 11 also serve as anti-splash devices?

A. They may prevent splash. Indeed screens are being used in ordinary faucets, without any air, to prevent splash.

Q. In other words, the idea of preventing water from splashing when it leaves the spigot or faucet is not, of itself, new with you?

A. With ordinary water, no.

Q. There isn't any difference in the terminology—and (Tr. 210):

I can save some time if you accept my statement that in your British patent corresponding to your Exhibit 15 (Defendant's Exhibit 15) you refer to the wire gauze as

being for an anti-splash device, whereas in this case, Exhibit 15, your United States patent, you use the term "anti-spout" device—and I am now going to ask you if there is any difference there between.

A. I didn't intend to give any difference.

Q. Does an anti-splash device tend to restrict and hold the water in a column as distinguished from splashing in all directions when it leaves the spigot or tap?

A. May I have that question.

Mr. Freeman: Read the question.

(Question read by the reporter.)

The Witness: It does; but there is one "but".

Q. Go ahead with the "but".

A. When you put on an anti-splash device with ordinary water and make it more uniform, the little amount of air that was touching a stream of water will be eliminated, so the water will be even more flat, or flatter, even though it will not splash when you put an anti-splash screen on an ordinary faucet. The stream of water, in its quality, not only will not be improved, but it will be a little worse, but, for practical purposes, it is advisable that it should not splash.

(Tr. 211):

Q. But you do go along with me with the idea that screens that offer some resistance to the water, when mounted on the bottom of a faucet, serve as an anti-splash device and maintain the water in a more definite column; correct?

A. Yes, I will.

• • •

(Tr. 256):

Q. (By Mr. Freeman): Will you agree with me, talking about your claim now, that it is your position that the screens break up the water?

A. The resistance means, which in this case is the screens, break up the water, yes.

(Tr. 257):

Q. Will you agree with me that the screens break up the water?

A. I answered that.

The Court: He's answered that.

Mr. Freeman: He is talking about another element of the claim, as you go on down.

Q. (By Mr. Freeman): What is the resistance means referred to in claim 1?

A. The screens.

Q. The same screens?

A. The same screens.

Q. So the screens have two functions, of breaking up the water and offering sufficient resistance; correct?

A. Yes.

Q. Then what brings about the portion of the claim for thereafter uniting the aerated water?

A. They unite the aerated water.

Q. What is the means for doing that, the structure?

A. Yes; in other words, the structure of the means should be such that after breaking they should unite the water, and the screens do the job.

Q. That's talking about the end result. I was asking you what the structure is that brings that about.

A. In this case the structure is screens.

(Tr. 258):

Q. So the screens, then, have the added purpose—

A. Yes, has all the purposes described in the means description of my claim.

Q. And, in so far as claim 1 is concerned, the water forms in a coherent jet, and that is done again by the screens; correct?

A. The screens do the whole job described by the means, yes.

Q. In other words, the two screens do the entire job of finely breaking up the water; second, offering sufficient resistance; third, thereafter uniting the aerated water; and, fourth, it forms the water into a coherent jet—correct?

A. Everything that is described is done by the screens.

Q. The two screens?

A. By the two screens, providing those two screens are proportioned with the orifices in the diaphragm 36.

Q. And I take it that the same reading of claim 1 with respect to the means clause would be accomplished by a single screen?

A. I am sorry, I did not understand the question.

Mr. Freeman: Read the question, please.

(Question read by the reporter.)

The Witness: If the two parts, the diaphragm 36 and the screen below are proportioned, yes.

(Tr. 259):

Q. Now you qualified that by telling me that the means clause would read on a single screen, providing something was done with respect to the upper diaphragm; correct?

A. If the screen is of a type required, yes; if the screen offers sufficient resistance with the velocity of the streamlets issuing from the diaphragm, yes. If the single screen does not, then you have to put a second screen or a third.

Q. If I were to make the device with the single screen that you showed in Figure 1 and it did not, as you say, bring about the end result, that is, breaking up the water, offering sufficient resistance, uniting the water, and bringing it out in the form of a coherent stream, where would I find the teaching to utilize two screens?

A. I am afraid I do not understand his question.

The Court: Read it to him again.

(Question read by the reporter.)

The Witness: In my patent you would find the teaching to make it with one or two screens, or three or four.

Q. (By Mr. Freeman): Now is it your position that the structure shown in Figure 1, with a single upper diaphragm and a single screen at the bottom end, shows an operative construction?

A. It can be made to operate perfectly well.

(Tr. 260):

Q. No, I am asking you—

A. It does show—

Q. I know I can make things to work. I know I can make things to not work, but I am asking you, if I made a device exactly as you have in Figure 1, would I have an operative construction.

A. Yes, you would.

Q. Would I have a means for uniting the water?

A. Yes.

Q. And that is the single screen?

A. Yes. If the single screen does not offer sufficient resistance to unite itself, then the restricted orifice below would help to unite.

Q. No, I am not talking about the restricted orifice. Claim 1 doesn't include a restricted orifice, according to your definition.

A. Oh, yes, it may include.

Q. Claim 1 may include also—

A. Certainly it may. It says "and for uniting" the stream, the means.

Q. Are you now telling us that, in addition to the screens, the two screens which you were talking about in Figure 4, the restricted orifice at the lower end is part of that means?

A. It could be.

(Tr. 261):

Q. I am not asking you whether it could be. Is it?

A. The claim says means for uniting, which is either

sufficient resistance offered by the screens, or a restricted orifice, or any other means.

Q. In other words, I can take my choice as to whether I want screens to do the whole job or whether I want to bring about a coherent stream by contracting the lower end of the casing?

A. Yes, it is teaching that you can take your choice.

The Court: If both of the screens shown in Figure 4 at the outlet end were removed, is it your opinion, then, that a restricted orifice alone would be sufficient to give you a coherent stream of aerated water?

The Witness: It wouldn't be a good stream and the streamlets then, Your Honor—as you see, diaphragm 36 shows vertical streamlets—those would go directly out and we would not have a coherent stream.

The Court: There is one thing that isn't clear in my mind. That is, according to Figure 4, if I understood your evidence a while ago correctly, if you employ those two screens shown in Figure 4 you would have your coherent, aerated stream of water emitting therefrom without regard to the restricted orifice at the bottom of the device?

The Witness: Yes, sir.

(Tr. 262):

The Court: But now, then, if you removed one of those screens and undertook to get the same result by using the remaining one, in that case you would need a restricted orifice to assist in order to get an aerated stream of water, coherent?

The Witness: You may, you may not, depending on the screen weave, you see, and the proportioning of the orifices in 36 but it would be rather difficult, if you didn't make any other breaking of the water before, to make an aerator with one diaphragm and just one screen and the streamlets would be striking direct to the screen; then it would be more difficult to obtain, but it is feasible.

Q. (By Mr. Freeman): Can we agree that, in so far as the means clause of claim 1, it does not include the contracted or restricted outlet end of the casing shown in either Figure 1 or Figure 4 of your first patent?

A. Claim 1 says means for uniting. Those means could be either additional screens or a contraction at the outlet end.

Q. My question was—I am going to ask the reporter to read it.

The Court: Read the question and the answer.

(Question and answer read by the reporter.)

Q. Optional—correct?

(Tr. 263):

A. Yes; or it can be both.

Q. Now you said something about Figure 1, when you had a single screen, that it had to be proportioned with respect to the diaphragm above the chamber; correct?

A. Yes, in each case the resistance has to be proportioned to the stream velocity.

Q. What is the proportion; what is in your patent? Turning to the four corners of your patent, will you read to the Court what you there say the proportion should be?

A. The patent gives a distinct example of proportioning with dimeisions shown by the hose-bib faucet in Figure 4. The dimensions of a hose-bib faucet are known and standard. Therefore the aerator shown in Figure 4 attached to that faucet shows the proportions and the dimensions of an aerator by indicating in the patent that the screens used in that aerator may have .6 square millimeter openings, and the dimensions of the holes in the diaphragm 36 are shown to be very small and they can be measured, and with the size shown the device will operate, as we have demonstrated the other day, a construction built according to Figure 4 and with the dimensions shown.

Q. Would you say that the size of the mesh of the

screens at the lower end is not critical?

A. Not critical with the limits. I indicated there what (Tr. 264):

I obtained, or I gave the disclosure which kind of screen would operate. Now, if you select lighter or heavier screens, the patent illustrates how you can operate, if you follow my construction, with different screens.

Q. Isn't it a fact that if I use a screen of one size, or two screens having the same size foramina, that the upper diaphragm openings would have to be of a different size?

A. I am afraid I don't understand the beginning of your question.

The Court: Read the question to him.

(Question read by the reporter.)

Q. In other words, would they have to be proportioned?

A. Yes, but the resistance offered by your screens, the velocity of the streamlets issuing from diaphragm 36 has to be proportioned to that resistance.

Q. Where would you start in making one of these devices; with the upper diaphragm; correct?

A. If you wish.

Q. I am trying to make one of these devices. I start with an opening in the upper diaphragm—correct—a single opening?

A. You want to make a single-opening diaphragm?

Q. Yes, I want to make a single-opening diaphragm. What size screen do I use?

(Tr. 265):

A. The patent says that you can use one or more screens. So, if you have a few screens in your hand, you put one; you see it is too little; you put two, three, four, until you find exactly the resistance required for your single stream. All the teaching is there.

Q. If I used a single opening, say, having half the diameter of the faucet opening, I would have to use screens at the lower end that would bring about the end result; correct?

A. I never said that, because when you say half the diameter of the faucet inlet or orifice is variable from one faucet to another. I can't answer those questions.

Q. Then let's take a diaphragm that has an opening in it of a quarter-inch.

A. Whatever your opening, if your opening gives substantial velocity—

Q. I am taking an opening one-quarter inch in a diaphragm and I am putting thirty pounds of pressure back of it. It will come out with substantial velocity, will it not?

A. I do not feel able to answer that question because I do not know what kind of screens you put.

Q. No, I am just asking you now, as a fact, if I take a faucet and put an orifice or diaphragm having an opening (Tr. 266):
therein, a single one, as called for in your claim, and it is a quarter-inch in diameter, thirty pounds head pressure, will the water come out with velocity?

A. Your opening was quarter-inch?

Q. Yes.

A. Probably not.

Q. Well, could I, in that case, add additional screens, that is, two, three, or four screens in order to get the end result?

A. I am afraid, for that amount of back pressure you mention, the opening of quarter-inch may be too big.

Q. Then let's reduce it to seven thirty-seconds of an inch, one thirty-second less than a quarter-inch. Would that be all right?

A. One has to make and see; I don't know.

Q. In other words, "make and see" is the answer?

A. When you want to depart from the construction shown to be perfectly operative, then naturally you will have to experiment and find out what will happen, if your fancy takes you to make something entirely different from what the invention indicates you to do.

• • •

(Tr. 280);

The Court: If the screen were entirely removed here, what would be the result? I mean 28.

Mr. Freeman: That's right; that's what we are talking about, the defendant's structure.

The Witness: Then the stream would not be as coherent as it would be with the screen 28, and it would not be as soft as it would be with the screen 28.

The Court: What about the volume of air in it with the number 28 removed, as compared to the case if 28 remained in it, if you have an opinion about it?

The Witness: The volume of air?

The Court: Yes.

The Witness: If the screen 28 is removed, maybe even more than with the screen on, but that air would readily separate from the stream as the stream is discharged from (Tr. 281):
the device.

• • •

(Tr. 282):

Q. Can we agree that the onion 26 and the wall 27 bring about more aerated water or mixing than what is discharged through the screen, because, as you have stated, the screen eliminates some of that aeration—correct?

A. Yes, I would say that without the screen 28 a little more air would be drawn out of the device as the water is

discharged.

• • •

(Tr. 300):

Q. Could you make your aerator so that it would attach and coincide with the size of the faucet, just as you have in Figure 4?

A. Yes, I could.

Q. You see in Figure 4 you show your casing the same size as the faucet outlet?

A. Yes.

Q. And in Figure 1 you show the casing at about half size with respect to the mixing chamber diameter; correct?

A. The faucet? Yes, it seems much smaller there.

Q. I am going to ask you if we take a two-inch diameter faucet—and there are many of those—could I then put on an aerator having a mixing chamber of the same diameter?

A. Mixing chamber of the same diameter? Yes, sir.

Q. And in that case I would have to reproportion the screens and the diaphragms?

A. No, sir, not at all; you don't have to reproportion at all.

Q. How about if I wanted to aerate water coming out of a fire hose that's about five inches in diameter, could I then put an aerator having a mixing chamber of the same diameter as the outlet of the hose?

A. You could.

Q. And that would just be a larger screen and a larger

(Tr. 301):

diaphragm; correct?

A. Yes; as long as you wanted the diameter of the aerator to be the same, then you have to put the corresponding screen in the path of the water.

• • •

(Tr. 352):

Q. I now hand you a photostat of a portion of your Figure 3 of your second patent, which we have marked as (Tr. 353):
Defendant's Exhibit 36 and will ask you to state if the structure there shown is an embodiment of claim 4 of your first patent.

A. Of claim 4?

Q. Yes, sir.

A. It could be.

Q. Well, is it or is it not?

A. Yes, it could be, it is.

(the photostat referred to was received in evidence as Defendant's Exhibit 36.)

Q. In other words, the figure that I gave you, Defendant's Exhibit 36, includes an apertured diaphragm, does it not?

A. Yes.

Q. And it includes a mixing chamber there below—correct?

A. Yes.

Q. And it includes a plurality of screens?

A. It does.

Q. Now in the case that you have there the apertured diaphragm is a single hole—correct?

A. Right.

• • •

(Tr. 355):

Q. Now, in so far as the structure that you have in Defendant's Exhibit 36, that is an apertured diaphragm that comprises only a single hole; correct?

A. That is what we see there, yes.

Q. And the remainder of the structure, in combination with that apertured diaphragm of a single hole, is, as you say, covered by claim 4 of your first patent; correct?

A. I would say the whole structure is covered by claim 4 of my first patent.

Q. All right, we agree on that. Can we likewise agree that the whole structure there is covered by claims 1, 2, and 3, also?

A. Yes.

Q. Now the structure that you have, as exemplified in Defendant's Exhibit 36, was the basis of the coverage of your first patent; correct?

A. I don't understand what you mean, the basis of coverage of my first patent.

Q. Well, an embodiment of the kind that you have in Defendant's 36 would, in your opinion, read directly on the first patent?

A. Yes, the first patent would read on it.

Q. And it was to that patent or that type of structure that you made your so-called improvement of the second patent; correct?

(Tr. 356):

A. I made the improvement of my second patent on different constructions I have shown.

Q. Now to the structure of Defendant's Exhibit 36 you added a restricted orifice upstream of that apertured diaphragm; correct?

A. I did.

Q. And you also, in addition to the restricted orifice, added a foraminous member upstream of the apertured diaphragm; correct?

A. I don't follow you, because you asked me if I added the restricted orifice and I said yes.

Q. And I also asked you if it is not a fact that your second patent likewise includes a foraminous member upstream of the apertured diaphragm.

A. That is not shown in the Exhibit 36 you gave me, but I see it in Figure 2.

Q. I am just asking you what your second patent covered. Isn't it a fact that you added a restricted orifice upstream of the apertured diaphragm?

A. I did.

Q. Now isn't it a fact that you likewise added a foraminous member upstream of the apertured diaphragm?

A. In my improvement patent, yes, I did.

(Tr. 357):

Q. I am talking about your second patent.

A. Yes.

• • •

(Tr. 374):

Q. Mr. Aghnides, will you turn to your first patent, which is Exhibit 11, I believe. Do you recall telling the Court that Figure 6 of that patent corresponded closest to defendant's structure; correct?

A. Yes, I do.

Q. Now when did you first make a device that had projections that extended in from the sides of the casing for

(Tr. 375):

impingement of the water thereon?

A. Oh, at the very early stage of my invention.

Q. When; do you have any idea?

A. That could be in 1934, '35.

Q. Now when you filed your application in Belgium in December of 1934 you did not show any device wherein the water impinged against projections on the side of the casing; correct?

A. I don't think I did.

• • •

(Tr. 380):

Q. Mr. Aghnides, my question is directed to Figure 6.

A. Yes, I understand.

Q. It is a fact that you there show in the aperture 56 openings that are at an angle in respect to vertical, so

that the jets project outwardly at an angle against the projections on the casing; correct?
(Tr. 381):

A. Correct.

Q. And you do not find any such structure in the Belgian patent nor do you find such structure in the first U. S. application, do you?

A. No, I do not find such a diaphragm with slanted orifices.

Q. Nor do you find projections to take the inclined or angular jets of water for finely breaking up the water and mixing it with air, do you?

A. No, I do not have that diaphragm in the specific construction of Figure 6 of my patent, but I have shown direct streams, vertical streams, which are able to strike baffles.

Q. Do you know when you first made a physical device of that kind, corresponding to Figure 6?

A. Oh, that must be very early, when I discovered the invention.

Q. When did you first bring that particular form of device into these United States?

A. You mean the device, the sample itself?

Q. No; either the device or a drawing of the device, corresponding to Figure 6, when did you first bring that into the United States?

A. I had the experience of this in Belgium and when I made the re-writing of this patent I thought it would be
(Tr. 382):
good to put it in, because I knew it would work that way too.

Q. You didn't put it in this application until December 31, 1937; correct?

A. Yes.

* * *

(Tr. 399):

Q. (By Mr. Freeman): Just before our noon recess we were talking about the Figure 6 of the first patent, No. 2,210,846, and I note there is a screen 62 at the lower end of that figure; correct?

A. Yes, sir.

Q. Now when you filed your application on December 31, 1937, and first presented Figure 6 to the United States Patent Office on that date, isn't it a fact that you told the Patent Office that the screen is not essential but that it is advisable to use it?

A. Yes, I think that the patent says so.

Q. In other words, in connection with Figure 6, when you first filed your application, in connection with 62, which is the screen, you stated "Here again it is advisable, but not essential, to use a screen as indicated by 62." Correct?

A. Yes.

Q. Now had you tried devices corresponding to Figure 6 without a screen prior to the time you filed your application of December 31, 1937?

A. Yes, I had.

Q. And you found that it was not necessarily essential

(Tr. 400):

to have a screen?

A. Yes, I had found that I could build the embodiment of Figure 6 without a screen.

Q. And without the embodiment of a screen, 62, the drawing is correct, showing the water in jet formation as being broken up solely by the shoulders or projections within the casing; correct?

A. Yes, if you take the screen out all we have are the shoulders upon which the streamlets break up.

Q. And would that give you aeration?

A. Yes, it would give you aeration. Maybe you have to build the shoulders a little wider in order to make a better

stream, but certainly it would produce a bubbly stream.

Q. Without a screen?

A. Without a screen.

Q. And that is what you told the Patent Office when you filed the application which resulted in the first patent in suit; correct?

A. Yes.

• • •

(Tr. 403):

REDIRECT EXAMINATION

• • •

(Tr. 419):

Q. What do you have to say with respect to a remark made by the Circuit Court of the Seventh Circuit that, element for element, the Aghnides and Felten devices are the same?

A. Well, I think I have explained at the beginning, first of all, that Felten has a suction-producing section, which is above this line, which we do not find in the aerator. So

(Tr. 420):

there is one element which is not in existence in the Aghnides aerator. Two, when we take the mixing chambers of the two devices below that line, we find elements in one that we do not find in the other; in other words, in Felten's mixing chamber there is one orifice through which your air and water enter that mixing chamber and there is no opening right to the atmosphere that would communicate the outside air with that mixing chamber, whereas in the Aghnides aerator we have independent air vents from the orifices that deliver water in the chamber. So we do not have, element for element, the same thing at all.

• • •

(Tr. 421):

Q. Now the Court of Appeals of the Seventh Circuit

said that the two devices, that is, the Felten vacuum pump (Tr. 422):

and your aerator, accomplished the same results, though perhaps not with equal efficiency. What have you got to say to that, Mr. Aghnides?

Mr. Freeman: Are you asking him that as a patent expert, or just his opinion of what the Court of Appeals in the Seventh Circuit said?

Mr. Ely: I am asking him what he has to say as to whether the two devices accomplish the same result, though perhaps not with equal efficiency.

The Court: I will let him go ahead and comment on his view of his device and Felten's, as connected with what was said by the Circuit Court, but, of course, I am not going to let him pass on the law as interpreted by the Court of Appeals of the Seventh Circuit—just what he has to say with reference to these two devices.

A. The results are totally different because—and we can prove it in this court—because the Felten device entrains so little air, and the aerator entrains not only one, twenty, fifty or a hundred per cent more, but hundreds of per cent more. So it's not a question of more or less. You have a new principle, too, which is such a radical difference from the results given by the Felten. We know that, as I have given the example before, the ordinary propeller airplane could go up to three hundred miles; to make it go over six hundred they had to invent the jet plane. Here we don't make it from three hundred (Tr. 423):

to six, but make it from three hundred to twelve hundred, four times more, so it has to be different, as we shall see during the performance of this demonstration; that, due to the difference in mode of operation and in structure, the results are also radically different.

• • •

(CROSS EXAMINATION INTERPOSED)

(Tr. 471):

Mr. Freeman: I noticed that you didn't run the Felten model by itself, without the vacuum-testing rig attached to it.

Mr. Hamilton: We are just getting to that.

Q. (By Mr. Ely): Now, Mr. Aghnides, will you please put the Felten model, Plaintiff's Exhibit 44, on the tank and operate it and show to the Court the character and volume of the stream produced. In this case I want the opening which is normally connected to a chamber to be evacuated to be open to the atmosphere and I want the pin which is halfway down the device left in place.

A. Now we have the Felten pump without the lateral pipe being closed; it's open to the atmosphere, which wasn't intended to be, but we are going to operate it so that, instead of ozone and air, air alone, atmospheric air alone,

(Tr. 472):

will go through.

Q. That is, there is a free admission of air from the atmosphere into the interior of the device; is that correct?

A. That's right. (Demonstrates with model on faucet)

Q. Tell us the character of the stream.

A. We have a stream which contains some air. I shall give the glass test. When the glass is filled it doesn't empty itself out rapidly, showing that there is very little air in the Felten stream.

Then we shall test now with the jar, and we shall see that the Felten stream does not splash and it does have some bubbles.

• • •

(Tr. 483):

Mr. Freeman: Now will you take the vacuum-test gauge off?

(Witness complies with request of counsel.)

Mr. Freeman: You are getting some aeration now, aren't you?

The Witness: Yes. We did get some with four.

Mr. Freeman: You are getting far better with one basket than you did with the four?

The Witness: Some better, yes, sir.

Mr. Freeman: You are getting water coming out which is whitish in color, aerated?

The Witness: Now.

Mr. Freeman: Would I do better if I had two openings for air inlet instead of one?

The Witness If there is such a pump available we shall be glad to test it, but I do not think that would make such special difference as we have seen with the aerators.

Mr. Freeman: Would you be kind enough to hold your finger on the normal air inlet of what you call the pump and then take the little plug out you put in as an extra, and then demonstrate it with only one basket in it? Now put your finger on it and start it up without the plug.

(Tr. 484):

(Witness complies with request of counsel.)

Mr. Freeman: Is it giving a relatively good aerated stream now?

The Witness: It's a much grayer stream delivered when the orifice was above, and we see some water coming out of the orifice.

Mr. Ely: What orifice? Out of the lower orifice.

Mr. Freeman: What would have happened had you had two orifices, so that you had twice the admission of air into the device than what you have there?

The Witness: Well, we would have had more air coming out—more water coming out.

Mr. Freeman: More aerated water?

The Witness: No; more water coming out the lower orifice.

Mr. Freeman: Is it your position, Mr. Aghnides, that with the extra openings you put in this model you would have more water coming out?

The Witness: Yes.

Mr. Freeman: Would you have more water coming out if you moved the opening down a little bit?

The Witness: If we move further down the opening?

Mr. Freeman: Yes, sir, toward the downstream end.

The Witness: More water would come out.

(Tr. 485):

Mr. Freeman: If you moved it up a little would you have more or less water coming out?

The Witness: Have less.

Mr. Freeman: So it does depend on where you put the opening as to the amount of water that would come out?

The Witness: Yes, sir; in other words, the displacement of water in the pump shows that the more you lower it, the more water will be spitting out of the orifice and the less vacuum will be created.

Mr. Freeman: In order to be fair, I'd like to have you put in two baskets and let's see what happens. This is all news to me, so I am asking only as a matter of enlightenment.

The Witness: (Demonstrating with model as requested) Now we see clearly there is hardly any air in the stream—I would say there is no air in the stream—and we see the water squirting out from that lower orifice.

Mr. Freeman: In other words, Mr. Aghnides, as you increased the resistance you began to flood the chamber and more water came out?

The Witness: That's right.

Mr. Freeman: And as we decreased the resistance by using only one baffle, or divider, or whatever you want to call it, there was less resistance and less water coming

(Tr. 486):

out of the spout?

The Witness: Yes, sir.

Mr. Freeman: And more aeration?

The Witness: More aeration, but still insufficient aeration.

Mr. Freeman: And we are both now talking about the demonstration of your model that you call the Felten pump; correct?

The Witness: Yes, sir.

Mr. Freeman: Now we found the same to be true with the Spring-Flo, or was it the Velva-Flo, last January; when we put in a plurality of screens, one on top of the other, we had too great resistance and the chamber filled up and water came out of the inlet openings; correct?

The Witness: Yes, we did.

Mr. Freeman: And last January, when we decreased the number of screens so that we had less resistance, the chamber did not fill up and water did not come out?

The Witness: Yes. Now I shall answer, if I may. Here we have applied the teaching of my patent about proportioning resistance, but, even then, because of the flooding, we could not put the orifice where we wanted it. When the orifice was lower down, then the aeration greatly decreased from what it would be in the upper position. So it is incorrect to say, even when the structure has been

(Tr. 487):

modified in accordance with the teaching of my patent—even then the amount of air going through the device is variable, according to the position of the orifice, whereas that condition does not exist in the aerator.

• • •

(Tr. 493):

Mr. Freeman: I am going to ask for a demonstration.

Mr. Ely: All right, sir, go ahead.

Mr. Freeman: I am wondering if you would take the

twenty-one screens off and just use what you call member 56 on your Exhibit 57 and just run some water through it.

The Witness: (Demonstrating as requested) Here we have the usual Felten stream as we have seen before with the transparent model.

Mr. Freeman: Is that a whitish stream that is coming out of there?

The Witness: It is a whitish stream.

Mr. Freeman: And is it coherent?

The Witness: It is coherent. So is this. Any stream—

Mr. Freeman: I was just asking the question was it a coherent stream.

The Witness: All right; yes.

(Tr. 494):

Mr. Freeman: Can you demonstrate that model with only one of the Felten discs in the bottom?

The Witness: Yes. (Demonstrates model as requested) Now we have in the Felten pump one basket instead of four, and we have a vacillating stream of water coming out.

Mr. Freeman: Is it whitish in color?

The Witness: It is whitish in color.

Mr. Freeman: Is there some air mixed with the water?

The Witness: Definitely there is.

• • •

(Tr. 496):

Mr. Freeman: Mr. Aghnides, to make the matter simple, I have here a drawing that I made which indicates two openings of different diameters; one is twice as large as the other, as close as I could do it with my eye—

• • •

(Tr. 497):

The Witness: What is the question. I see the drawing and the orifices.

Mr. Freeman: Water extends in through the orifice A in the direction indicated by the arrow on top of the drawing. Now, with that proposal, I am going to put an air inlet into the diaphragm, or into that member that has the letter "A" in it, and then I am going to put another one into the member that has the letter "B" in it, and I am going to ask you which one will take in more air, water coming into A at thirty pounds pressure.

The Witness: Frankly, without experimenting, I would be unable to say, because I would think that water might come out of that orifice that is leading into the narrow opening.

Mr. Freeman: Isn't it a fact that if water came from the orifice A it would go into the opening B with considerable space all around it?

(Tr. 498):

The Witness: Yes, sir, at least at the portion near to that smaller orifice.

Mr. Freeman: So that you would then have a jet of water defined by the diameter of the orifice A moving into an enlarged space B; correct?

The Witness: Well, that can not be said also, whether it is correct or not, because it will depend on the diameter with respect to the thickness to know, and also on the pressure, to know whether the stream will be cylindrical or it will spread out to become conical in the chamber. There ar too many unknowns to answer.

Mr. Freeman: Just answer my question. It is a fact that as the water leaves the orifice A, just as it enters that which we will call the orifice B, the enlarged opening, four to one, isn't it a fact that you will then have a column of water with space all around it?

The Witness: Just as it leaves, yes, I think there will be a space at the point it leaves the orifice A.

Mr. Freeman: Now, so that we have something of record here, I am going to call the air inlet that goes into A by the reference numeral 1 and the one that goes into the portion B that we have now talked about as number 2. And it was your statement that the water might spread out by the time it got down to the air inlet 2; correct? (Tr. 499):

The Witness: It might; I don't know.

Mr. Freeman: Now would I take in more air if I put my opening at the exact top of the enlargement and just below the upper edge of the orifice B—and that one I am going to mark 3—would we take in more air in 3 than we would in 1?

The Witness: My first reply was, about the 1, that I do not know whether the water would come out that orifice instead of pulling air in.

Mr. Freeman: My question was, in the example I have given you, will you take in more air from 3 into B than you will from 1 into A.

The Witness: How can I answer that when I don't know whether any air or much air will be going through 1? Here we have a truncated thing.

Mr. Freeman: I am not talking about a truncated thing. I have given you a concrete example and I am merely asking you now whether you will get more air from 1 into A than you will from 3 into B.

The Witness: I am unable to say, because this does not correspond to any of the constructions we built experimentally and know what it is all about; this is something new, and I am unable to pass this examination, because it is very theoretical.

(Tr. 500):

Mr. Freeman: You can't answer that, can you?

The Witness: No.

Mr. Freeman: Will you agree with me that the stream of water passing through A will, at the lower end of the orifice A, project in the form of a column or stream or jet?

The Witness: I would think so.

Mr. Freeman: And will you agree that between that jet there is space that is not filled with water?

The Witness: Yes, at the point nearest to that orfice I think there will be some space.

Mr. Freeman: And will you agree that, because of the pressure drop between A and B when the water is being forced in at thirty pounds, it will cause a partial vacuum and suck in air through the opening 3?

The Witness: I would think so.

Mr. Freeman: Now my opening 1 into A indicates that the air, if any, being drawn in would have to be drawn into and against the column of water which we have agreed entirely fills the space A; correct?

The Witness: I would think so. I don't know.

Mr. Freeman: So that can we from that agree that there would be air coming in at 3 and very little air coming in at 1?

(Tr. 501):

The Witness: I answered that before, that not knowing how much air would come in through 1—.

Mr. Freeman: Then I am going to ask you, Mr. Aghnides, why it was that when you made your plastic model you ran the air-inlet opening into that portion of the diaphragm which produces the jet of water and not into the chamber below the diaphragm, whereas in your Exhibit 57 the air inlet goes into the upper portion of the mixing chamber—why the difference?

The Witness: I would like to see the drawing of the plastic model.

Mr. Freeman: Don't look at the drawing; look at the plastic model.

The Witness: Well, we will look at the plastic model too.

Mr. Freeman: I have got a little piece of wire and I just want you to take off the bottom, and you will note that the enlarged opening where you get a pressure drop terminates short of the air inlet.

The Witness: From what I see with bare eyes, I think you are right, as far as construction is concerned.

Mr. Freeman: That's all.

• • •

(Tr. 503):

AFTERNOON SESSION, OCTOBER 11TH

The Court: All right, proceed.

Mr. Ely: If Your Honor please, in view of what happened just prior to the noon recess, I wish to say this: The difference between the metal model of the Felten device and the plastic model, to which attention was called by Mr. Freeman, is a matter which to us seems entirely insignificant; we don't believe the difference between the two is going to make any change in the operation of the devices. However, we would like, in order to clear that thing up so there will be no argument about it, we would like permission to withdraw Plaintiff's Exhibit No. 44, which is the plastic model, and rework it and put it in the same condition to correspond with the metal model. We would like permission to do that, and then would like to run the test with the change made and show Your Honor that it so works out that there isn't any difference—

The Court: I won't let you withdraw what you already have in. If you want to put in another type, all right but let's keep what we already have in—we have gone through it now—and not withdraw it. If you want to put in another

one to show there isn't any difference, it's all right to do that.

Mr. Ely: I understand, then, that you do not want (Tr. 504):

to let us have the model to make any changes on it?

The Court: Do you want to withdraw it to make some changes?

Mr. Ely: We wanted to take it out and rework the model so as to make that little change which will make it agree with the metal model. We want to drill a couple of holes here a little deeper.

* * *

(Tr. 505):

ELIE P. AGHNIDES, the plaintiff, resumed the stand and testified further as follows:

REDIRECT EXAMINATION (Cont'd)

By Mr. Ely:

Q. Now, Mr. Aghnides, I want you to demonstrate your Aghnides vacuum pump, which is Plaintiff's Exhibit 47, showing the character of the stream, showing the way in which it operates.

A. My vacuum pump is now attached to one of the faucets and we shall turn the water on and see the stream. (Demonstrates model) We see a stream of water, whitish and containing some bubbles, and I shall fill up the glass to see the amount of air that will remain on top. (Demonstrates with glass) When the glass is filled and I withdraw it, one can see that there was very little air in the stream, because the glass is full of water. (Demonstrating with jar under stream) Now the stream coming out of my pump is, like the Felten stream, non-splash and (Tr. 506):

contains some bubbles, as one can see on the glass jar.

* * *

CROSS EXAMINATION

(Tr. 523):

• • •

(Tr. 557):

Q. When I called your attention to Figure 8 of your United States Patent, the patent in suit, and Figure 8 of your abandoned application sometime ago, you disclaimed any part of Figure 8, did you not?

A. Yes. Figure 8 is not an aerator.

Q. And Figure 8 was in the application when it was first filed, in the abandoned application; correct?

A. Yes, of course.

Q. It has never been deleted from your application; correct?

A. It has not.

Q. And it resulted in Figure 8 of the patent in suit, the first patent; correct?

(Tr. 558):

A. Yes.

Q. And the same is true of Figure 9?

A. Correct.

• • •

(Tr. 568):

Q. (By Mr. Freeman): I now hand you another fluid mixing device which is marked "Clean-Stream" and will

(Tr. 569):

ask you to state whether or not that is the device that was involved in the Seventh Circuit in the suit entitled Aghnides versus Rightway and Goodrie.

A. Yes, it seems to be the same device.

• • •

Mr. Freeman: I am going to offer the aerator just identified by the witness as the device involved in the Seventh Circuit as Defendant's Exhibit No. 39.

(The model referred to was received in evidence as Defendant's Exhibit 39.)

Q. (By Mr. Freeman): Mr. Aghnides, for the purpose of illustration only, is the drawing that I am handing you now illustrative of the physical construction of the last exhibit, number 39, or the Goodrie device involved in the Chicago suit?

• • •

(Tr. 571):

The Witness: Yes, this seems to illustrate the general idea of that.

Mr. Freeman: I am going to offer the drawing illustrative of the Goodrie device, Defendant's Exhibit 39, as Defendant's Exhibit 40.

(The drawing referred to was received in evidence as Defendant's Exhibit 40.)

• • •

(Tr. 575):

Q. Does your memory serve you that in connection with the suit in Chicago, the Seventh Circuit suit against Goodrie, you there relied on Figure 6, just as you have done in the case here, as being the closest device of your patent, or representation of your patent, corresponding to defendant's structure.

A. I think so. I did rely on Figure 6.

• • •

(Tr. 597):

J. W. McGARRY, a witness for the plaintiffs, being first duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Ely:

Q. Please state your name and residence, Mr. McGarry.

A. My name is J. W. McGarry. I live in Waterbury, Connecticut.

Q. What is your present occupation?

A. I am retired, sir.

Q. What was your former occupation?

A. I was General Sales Manager of the Waterbury Manufacturing Division of the Chase Brass & Copper
(Tr. 598):
Company.

Q. How long had you been with the Chase Brass & Copper Company?

A. Forty-four and a half years.

• • •

(Tr. 601):

CROSS EXAMINATION

By Mr. Freeman:

Q. I show you a copy of Aghnides' patent, the first one, Exhibit 11, and I am going to ask you if your company ever made a device with one apertured diaphragm and a lower screen, just the two pieces.

A. I imagine we did, Mr. Freeman. I have no record—

Q. Well, did you ever sell any of them, an upper one and one lower one?

A. No, sir.

Q. Did you ever sell any—and that is what we are talking about—devices corresponding to Figure 4 of Exhibit 11, one upper diaphragm and two lower screens?

A. No, sir.

Q. Now I call your attention to Figure 3 of the second
(Tr. 602):
patent in suit, Exhibit 12, and will ask you if your device, when you sold it—I am talking about the commercial sales now—included five screens in the lower end of the device.

A. Our devices were all made with the upper and lower

diaphragms and three screens.

Q. In other words, every one of your devices included two upper diaphragms and five lower screens?

A. Included an upper and lower diaphragm and three screens.

Q. That is the only form that you sold?

A. That's right.

Q. So that the device that you sold corresponds to Figure 2 of the second Aghnides patent, Exhibit 12, which shows two upper diaphragms, air-inlet openings below the diaphragms, and three screens at the lower end?

A. That would be my impression.

Mr. Freeman: That's all.

• • •

(Tr. 609):

Mr. Freeman: Are you going to read Mr. Guerber's testimony?

The Court: I asked him to state the substance of it, and you can state the other part.

Mr. Freeman: I would like to read a certain part of

(Tr. 610):

it. You have it in front of you and I would suggest that you turn to page 55.

I am going to state, as an officer of this court, that I would never have withdrawn my misuse defense or abandoned the cross complaint in connection with violation of the anti-trust laws if I was not directed by general counsel for the Kress Company last Thursday afternoon to do just that. If that doesn't indicate control of a lawsuit, I don't know what does.

I want to say to this Court that we are being paid by Melard Manufacturing Company. They are not in control of this lawsuit.

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(Tr. 622):

NORMAN LETTVIN, a witness for the defendant, being first duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Freeman:

Q. Will you please state your name?

A. Norman Lettvin.

Q. Where do you reside?

A. Chicago, Illinois.

Q. By whom are you employed?

A. Bair, Freeman & Molinare, patent attorneys.

Q. Your profession?

A. I am a patent attorney.

Q. A lawyer?

A. I am a lawyer.

Q. Briefly, give me your schooling, your educational background.

A. I graduated at Illinois Institute of Technology in Engineering in 1943, and I worked for the National Advisory Committee for Aeronautics' Aircraft Research Laboratory in Cleveland, Ohio, for a period of slightly less than five years, until about September, 1947. During that time I went to night school and I graduated from Cleveland-Marshall Law School in Cleveland, Ohio.

(Tr. 623):

After that I passed the Bar in Ohio and went to work for General Electric Company in Schenectady, New York, as patent attorney, worked for them slightly less than a year and returned to Chicago and started to take graduate work in Engineering at Illinois Institute of Technology.

I then went into the practice of patent law in Chicago, first by myself, and then I was employed by Bair, Freeman

& Molinare, beginning in May, 1949, and I have been with them ever since.

Incidentally, I am a Professional Engineer in the State of Ohio and I have a license, and I have a license as Professional Engineer in the State of Illinois, and am licensed to practice law in the State of Illinois. I am also admitted to practice before the Patent Office.

Q. I was going to ask you, you read and understand drawings?

A. Yes, sir.

Q. You read and understand patents?

A. Yes, sir.

Mr. Ely: I admit the qualifications.

Mr. Freeman: All right, thank you.

Q. (By Mr. Freeman): Mr. Lettvin, I call your attention to the Hyatt patent, U. S. Patent 326,221—

Mr. Freeman: I am going to ask that the Hyatt patent—and I might say, Your Honor, that I am going to offer a group of patents, ten in number, which are all put in one book, and I will offer them collectively as Defendant's Exhibit 44, and then I will refer to the one marked "1" as 44-1, and so on, so that we don't have too many exhibits.

Mr. Ely: Can you give us the names and the numbers?

Mr. Freeman. I will give you the list. Number 1, Hyatt, is 326,221; Number 2, Ferguson, is 591,830; Number 3, Claflin, is 881,548; Number 4, Lockwood, is 1,195,044; Number 5, Aghnides, is 1,912,113; Number 6, the Felten British patent, is 6,012; Number 7, Purser British patent, is 136,663; Number 8, Battersby British patent, is 323,242; Number 9, Aghnides British patent, is 375,066; and Number 10, Solomon British patent, is 405,316.

(Book of patents received in evidence as Defendant's Exhibit 44.)

Q. (By Mr. Freeman): Now will you briefly tell us what the Hyatt patent has relation to?

A. The title of the Hyatt patent of 1885 is "Art of Purifying Water." Reading from the first column, beginning with line 8, it says:

> "The invention relates to the art of purifying water; and it consists, essentially, in a novel apparatus whereby air may be intimately combined with the water for the purpose of oxidizing its impurities according to well-known principles and the water then directly (Tr. 625):
>
> passed into the service pipes of a city or house, or first into a filter, whereby all flocculent matter is arrested, and then into said service pipes."

I would then like to call attention, later on in the first column on the first page of the patent, beginning with line 33 and running through line 52, if I may read:

> "Whether or not the water and air will be brought into such intimate relation as to insure the chemical purification of the water thereby will depend upon the nature of the apparatus employed for effecting this purpose; and it is to be remarked that in the purification of water for large cities or for manufacturing districts it is essential that the apparatus be simple in construction and be capable of utilization without great expense as to the original construction as well as to its maintenance. The object of the present invention is, therefore, to produce an apparatus whereby, in a continuous process, water may be rendered chemically pure by its union with air and the inert material remaining in the water be removed, the apparatus being simple in construction and uniform and effective in its operation and maintainable at a minimum expense."

Q. Now, first, that device is for purifying water in a plant, or a municipal water plant or city water plant, or an independently-owned plant, as distinguished from a (Tr. 626):
device that is to be attached to the type of water system in your home; correct?

A. That's correct.

Q. Now I am going to ask you to turn to figure 5 of the patent. Do you there find a plurality of screens through which the water must pass?

A. Yes. Figure 5 is on the third sheet of the drawings and is one of the modified forms of the invention. It is found, when the sheet is turned so that the figures read horizontally, that is, Figure 4 and Figure 5, it is in the upper right-hand corner of the third sheet of drawings, and it discloses a generally vertical tubular casing, to the upper end of which is connected a pipe D, and there is an arrow from that pipe D pointing downward, which indicates the direction of flow of water from that pipe D.

Q. That pipe D is of smaller diameter than the casing into which it is connected?

A. That's correct.

Q. So that there is a pressure drop as the water passes out of the conduit D into the chamber there below; correct?

A. That's correct.

Q. Now, extending across the chamber below the conduit D, I find five elements, referred to by the reference letter "L". Can you tell me what they are?
(Tr. 627):

A. Those are screens; and I might call your attention to the specification, that the specification states that those are screens L at a number of places in the specification; particularly on page 2, column 1, I see it very quickly, in line 44, "screens L."

Q. And, in addition to the specification, you can understand from the drawing that the symbols for the portions L represent screens?

A. That's right, the visual image is very ready.

Q. I note above the screens and below the conduit D, where it enters the large chamber, an attachment extending to the left, referred to by the reference letter W. What is that for?

A. That is an air-inlet pipe which connects to the side of the casing between the top of the casing through which the water enters and the uppermost of the five screens disposed within the casing.

Q. What brings about or causes the air to be brought in, if you know?

A. When the water discharges from pipe D into the larger casing, a pressure drop exists, which sucks in air through the valve which, I believe, is referred to as X. May I check the specification in that regard?

The Court: Check it and tell us what it is.

(Tr. 628):

The Witness: (Reading) "One side of this receptacle A is provided with a small pipe, W, the outer end thereof being closed, and provided on its under side with a valve, X, opening upwardly within the pipe."

Following right after that, it says: "As the water flows down through the receptacle, taking the air with it, a partial vacuum is created in the pipe W, and the valve X formed therein allows the air to pass up through it to be commingled with the flowing water."

Incidentally, I might point out that there are arrows shown in Figure 5, one adjacent to valve X and two adjacent the pipe, W, into the cylindrical housing, which indicates the path of the air as it passes through the conduit or into the cylindrical housing.

Q. (By Mr. Freeman): When you have that pressure drop from the pipe D into the chamber there below, that creates a partial vacuum?

A. Yes, sir.

Q. And does that bring about a sucking in of air from outdoors?

A. Yes, sir.

Q. And the valve X, then, is opened at the time that you have the pressure drop in order to permit air to flow in?

A. When the water is flowing, the suction of air lifts (Tr. 629):
the valve X sufficiently so air enters into the chamber, for mixing with water.

Q. And when the water is no longer flowing, or is turned off, the valve finds itself in what position?

A. It falls down to the lower position, under the force of gravity.

Q. Would there be any difference in operation if the valve were entirely omitted, so far as sucking air in is concerned?

A. Absolutely none.

Q. Now I note, in addition to the five screens in Figure 5, that there are some parts extending in from the wall of the chamber, marked by the reference letter L. What are they?

A. You mean M?

Q. M—I'm sorry.

A. The "M" are referred to as deflecting-plates. I note that in the specification, page 2, column 1, line 32. Now those could also be properly termed baffles, I believe.

Q. I was going to ask, if water strikes the members M that extend in from the walls of the receptacle A, would that cause deflection or breaking up of the water?

A. Yes, it would; and he purpose also of the deflecting-plates M is to cause agitation to further mix the water and air, if desired.

(Tr. 630):

I might point out that there is a fairly good description of all of the devices utilized in this single patent as agitating means for bringing about the mixing of the water and the air, and it is further pointed out in the specification that, while some of the modifications show the use of more than a single one of the agitating means, nevertheless, each of the agitating means may be utilized by themselves, if desired, including the screens L by themselves. With respect to that—

Q. Will you just point out, without necessarily reading it, that portion of the specification that justified your last statement?

A. Particularly page 2, column 1, lines 36 to 49—and I think two sentences there should be read.

The Court: You needn't read 36 to 49, because I have just read it, for my benefit.

Mr. Freeman: All right.

Q. (By Mr. Freeman): I referred to the large member as a chamber, the member A, and I am going to ask you to tell us what you find in the specification for the reference letter A. You can find that on line 76, column 2, page 1.

A. (Reading): "In the accompanying drawings, A designates the pipe or receptacle in which the water and air are combined."

(Tr. 631):

Q. So that is a receptacle?

A. That is.

Q. Can I use the word "chamber"?

A. It is a chamber-defining means; that is, the chamber is within the receptacle.

Q. And do you find that the chamber within the receptacle is for the purpose of mixing air and water?

A. Yes, sir, it is within the chamber that the mixing takes place.

Q. I am going to hand you a chart, particularly of Figure 5, which we will mark as Defendant's Exhibit 44-1-A. I am just going to ask you quickly to tell me the various elements that you have colored in the chart, Exhibit 44-1-A. Just do it briefly.

(The chart referred to was received in evidence as Defendant's Exhibit 44-1-A.)

A. That chart shows the casing or chamber-defining means colored in yellow, the apertured plate, or apertured diaphragm, through which water is introduced into the chamber, colored blue—that, incidentally, surrounds the lower end of pipe D—

Q. and constitutes the top portion of the chamber A; correct?

A. That's correct—and the mixing means, particularly the screens L, colored red, the five screens colored red. (Tr. 632):

Q. Now will you next turn to Ferguson—

The Court: Wait one minute.

At the terminal there of D, where it enters into the so-called mixing chamber, that portion you have marked in green there—

The Witness: Blue, sir.

The Court: Where is there something in the specification that describes the characteristics of that element?

The Witness: The element is shown simply as structure.

The Court: You have marked it blue for some reason. What was your terminology for it; how did you define it?

The Witness: It is the structure which defines the upper end of the mixing chamber A and also surrounds the inlet end for water, which is at the terminal end of pipe D.

The Court: What did you call it?

The Witness: The apertured diaphragm.

The Court: Where is there anything in the specification that says it is an apertured diaphragm?

The Witness: There is nothing in that specification which says it is an apertured diaphragm, Your Honor.

The Court: How do you know that it is apertured; is there anything in the patent that says it is?

The Witness: Because it opens through that plate at the top.

(Tr. 633):

The Court: Well, it can open through it entirely, as distinguished from through an aperture?

The Witness: I see what you are driving at—

The Court: I am just trying to find out whether anything in the patent describes what that is, whether an entire opening or an apertured opening.

The Witness: The specification says particularly that the pipe opening is of smaller diameter than the casing A. Therefore, there must be material that extends between the pipe wall and the vertical walls of the casing A. Does that answer your question?

The Court: Well, in one way, it does. I was just eager to find out if there is anything in this patent in connection with the specification that defines that particular portion of the A down there, whether it is an apertured opening or whether it is just a complete opening, like a smokestack.

Mr. Freeman: There isn't any question it's a complete opening.

The Court: Let the witness answer it.

The Witness: It is a complete opening; the whole pipe opens right into the casing.

The Court: Maybe I have a different conception of the words "apertured diaphragm." I was construing that as

(Tr. 634):

one having various openings in that member.

The Witness: No, sir; it has a single opening, a single aperture in the diaphragm.

The Court: That is what I wanted to find out.

Q. (By Mr. Freeman): Would you turn to claim 1 of the first patent in suit and tell me what is there defined as the apertured diaphragm, how many openings are there provided?

A. It says, reading from claim 1 of the first patent in suit: "... a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity."

Q. Now I am going to ask you if you find in the Hyatt patent, Figure 5, at the upper end of the chamber, a single orifice.

A. Yes, sir.

Q. And does water, then, pass through that orifice into an enlarged chamber there below?

A. Yes, sir.

Q. And does that water, as it passes from the pipe D through the upper end member of the chamber, bring about a pressure drop at that particular point?

A. Yes, sir.

(Tr. 635):

Q. And is that pressure drop brought about by the enlargement of the chamber below the stream of water?

A. Yes, sir.

Q. Is that likewise true in the Aghnides patent?

A. Yes, sir.

Q. And is it likewise true that air is sucked in because of the pressure drop at that particular point?

A. Yes, sir.

Q. Now I am going to ask you to turn to the second patent in Defendant's Exhibit 44, which is the Ferguson patent, and which we will refer to as Defendant's Exhibit 44-2, and tell us briefly what is there disclosed.

A. The title of the patent is "Apparatus for Mixing Liquids and Gases." I call attention to column 1, lines 9 to 14, which read as follows:

"This invention relates to an apparatus so constructed that it will charge liquids with gases in such a manner that the latter will be finely subdivided and will be suspended in the liquid in the form of small bubbles, that will be slow to escape."

But, more particularly, this apparatus was for use with baths and, as shown in Figure 1, the apparatus is for use in a bathtub, for charging the bathtub with carbonic-acid gas in solution with the water for, you might say, ap- (Tr. 636):

proximating what they call Nauheim baths, which apparently were quite popular in that period, 1897. Do you want me to continue?

Q. I was going to ask you perhaps to refer to Figure 2 of the patent, and can you briefly tell us its makeup, as you understand it, from the patentee's explanation thereof?

A. Figure 2 shows the operative mechanism for combining the water or liquid and the gas. There is a casing d, having therein an inner tubular member e, and between the inner member and the outer member there is formed an annular passageway through which the liquid moves. The member e is hollow or tubular and the gas is drawn in through there.

Q. With respect to the tube e, what is the container that the liquid flows through?

A. The liquid then passes down between the portion marked d' and the lower portion of the central tube e and

discharges in the form of a conical jet, that is, conical downwardly, the apex being downward, and that movement of the water operates to draw in—or, I should say this: It creates suction, because of the pressure drop, and that suction will draw gas through the tubular member e and the water and the gas, or liquid and gas, will then enter into a mixing chamber, which is a little difficult to see, but I will try and define it. Just below the end of the

(Tr. 637):

tube e there's a thimble-shaped member marked h, and that has many perforations therethrough, as clearly shown in the drawing, and, if you consider a cup-shaped member, the inside of that cup-shaped member is a chamber and within that chamber the water and the gax mixes and is further mixed by impingement on the perforated thimble member h, and the water and the gas then issues through the perforated thimble member h as an aerated spray.

Now the patent points out that when an aerated spray is discharged it is more desirable to discharge the fluid into the bathtub in a quiet stream. So they provide a casing, called h', which collects the discharge of aerated, or gasified spray—because air is not mentioned—gasified spray, and the gasified spray is caused to pass through a perforated member, i, and then through a contracted nipple, i^2.

I might read from the specification, which says, beginning in column 2, line 69:

"By the particular construction of the injector the gas is divided into small bubbles, which will be slow to rise through the saturated body of liquid within tub A, so that an effervescent bath is obtained which permits a prolonged use without loss of the original properties of the

(Tr. 638):

admixture. The injector furthermore so breaks the force of the current that the charged liquid will escape into the

tub through the nipple in a quiet stream, and not in the form of a violent current."

And that statement means to me that the mixture of water, with bubbles disseminated throughout, or bubbles disseminated therein, is a non-splash stream.

Q. And is that brought about by the portion that is referred to as the nipple, i^2, at the lower end of the nozzle, i?

A. Both the nipple, i^2, and the perforated member, i, contribute to that effect.

Q. You find that described, do you not, starting with line 62, column 2, page 1?

A. Yes.

Q. Would you read that into the record, please?

A. Well, as I stated before, spray is formed above the perforated member, i, and now the specification says this:

"This spray is collected in a chamber formed by a surrounding tube h', and thence flows downward through a number of parallel upright ducts or channels i' of a perforated nozzle i, to be finally discharged into a bath-tub A or other receptacle through nipple i^2."

Q. Have you called attention to the same column wherein the patentee talks about the device being used for other (Tr. 639):

purposes, starting with line 84?

(Tr. 639):

A. I have not yet.

Q. Will you do that?

A. I should like to read this short sentence:

"It is clear that the invention may be applied to different purposes from the one specified, it being adapted generally for the admixture of volatile, semivolatile, or gaseous substances or of solid or semisolid substances (under pressure) with liquids."

Q. Now is it true that in the Aghnides device one of the liquids, to-wit, water, comes in under pressure?

A. Yes, sir.

Q. I am next going to ask you to turn to the Claflin patent, which is number 3 of Defendant's Exhibit 44, and tell us briefly what is there disclosed; and, at the same time, I am going to hand you a chart of one of the figures of that patent, which we will mark Defendant's Exhibit 44-3-A, and, perhaps, in order to save time, you might talk about the patent and the chart together, so that we do move along.

(The chart referred to was received in evidence as Defendant's Exhibit 44-3-A.)

A. The Claflin patent of 1908 is entitled "Air Exhausting Liquid Supply Apparatus." Now the principle form, and the one which I wish to call attention to, is (Tr. 640):

Figure 1, which is the big figure on page 1, in the lower right-hand corner. I should also like to call the Court's attention to the second sheet of drawings, which is Figure 6—

The Court: The chart you handed me is Figure 2, isn't it?

The Witness: Figure 1, Your Honor. Figures 2 is on the left.

The Court: I see it; Figure 1.

The Witness: I should also like to call the Court's attention to Figure 6, particularly the right-hand side of the drawing—that is the second sheet of drawings—which shows the device of Figure 1 in very small form, but identified as numbers 12 and 15, as mounted at the end of a faucet; actually it is a faucet, positioned above the sink or basin, which might be a wash-basin, I imagine.

Now the device of this patent is a device for exhausting air from the heating system of a building, so as to bring the heat up more quickly, and I might call the Court's attention, in this colored chart, Defendant's Exhibit 44-3-A, to the portion thereof colored yellow, which is the casing, and the portion thereof colored blue and identified by numeral 16, that is, the inlet nozzle through which water is directed as a jet. Now there is a pipe 15, which you see extending below the device, generally off to the right, (Tr. 641):

and that goes up there and intersects a portion of the space, and defines actually a space between the nozzle colored blue, which is 16, and the nozzle colored red, which is 18, and that is a pipe through which air is drawn. The jet of water leaving blue nozzle 16 entrains and sucks in the air fro mpipe 15 and goes into nozzle 18, which is called the combining nozzle, and after it leaves the combining nozzle 18 the mixture of water and air passes downwardly through the outlet end, which is on the left-hand side of Defendant's Exhibit 44-3-A, and you will see that the discharge end of the faucet, which is unnumbered, has two screens—what appears to be two screens, I should say, because there is no reference in the specification thereto—appears to have two screens mounted across the discharge end, plus a converging outlet.

Now, referring to the specification, I would like to call attention, first of all, to the object of the invention, which is in page 1, column 1, beginning with line 8:

"This invention has for its object to enable a liquid suplying faucet to perform the additional function of exhausting air from a vacuum chamber or element of an apparatus for utilizing a vacuum or partial vacuum."

I might also state that the first portion of the next sentence is important, because it defines where it is embodied, and may I read that:

(Tr. 642):

"The invention is embodied in a cock or faucet having a liquid inlet and outlet, an intermediate air inlet, means for causing the flow of liquid through the casing to induce an inflow of air through the air inlet . . ."

And then other means are recited which I won't call the Court's attention to, but I believe that that statement pretty well defines the basic combination of elements.

May I then skip down to line 25 in column 1, which says:

"When the faucet is performing its ordinary function of supplying liquid therethrough, the air and liquid passing together from the outlet of the casing."

Next may I call the Court's attention to column 2, beginning with line 103, which describes the operation, which may I read:

"The relative arrangement of the nozzles 16 and 18 and air chamber 19 is such that a jet of water formed by the nozzle 16, is projected across the air chamber into the combining nozzle, and induces a flow of air through the inlet 15 into the air chamber 19, the air mingling with the jet of water in the combining nozzle, and passing out with the water through the outlet 14."

Q. Now I was going to ask you if it is not a fact that in the U. S. application as originally filed—

(Tr. 643):

The Court: The application of what?

Mr. Freeman: The application of the Aghnides patent, Plaintiff's Exhibit 15.

Q. (Continuing)—there is not a figure that corresponds rather closely to the structure that you have just defined, that is, the member 15 and the mixing chamber 18. Will you point out the particular figure to the Court?

A. Yes, sir. In the drawing as originally filed Figure 2 shows an inlet nozzles, or tube—it is not in nozzle form; it is in cylindrical form—and it is shown so arranged with a combining nozzle that the water is projected through a converging-diverging type nozzle, indicated by numeral 21, and the upper end of the pipe 20 is spaced from the lower end of the upper pipe so as to define an air inlet through which air is introduced.

Now I might point out that the combining nozzle 18 in the Claflin patent is also of the converging-diverging type. May I also point out that it is intended, in the file wrapper, which is Plaintiff's Exhibit 15, that the lower end of pipe 20 be provided with two screens 9, as shown in Figure 1, and with a converging outlet, as indicated by number 42 in Figure 1; and, so that I might give you a basis for such an arrangement, may I call the Court's attention to Figure 2 of the British patent 468,687, which is Defendant's (Tr. 644):

Exhibit—

Q. The British patent of Aghnides?

A. The British patent of Aghnides.

Q. Just refer to it as the British Aghnides patent.

A. British Aghnides patent 468,687, which shows the same type of arrangement substantially as in Figure 2 of the American application, Plaintiff's Exhibit 15, and shows two screens 9 at the bottom thereof, although the constricted outlet is not shown in the British patent. However, the arrangement of these dot-dash lines at the bottom of Figure 2 is intended to indicate that the terminal end of the casing is similar to the terminal end in Figure 1 of Plaintiff's Exhibit 15.

Q. I was going to ask you if it is not a fact that what you have just described in connection with the British patent, Figure 2, is not likewise found in the Belgian patent, Figure 2.

A. Yes, it is, in the Figure 2 of the Belgian patent, which is Plaintiff's Exhibit 13; and that arrangement corresponds with the arrangement shown in the Claflin patent and Defendant's Exhibit 44-3-A.

Q. Now, Mr. Lettvin, still referring to the Claflin patent, Figure 2, and the chart, you there find at the lower end of the faucet a contracted or restricted discharge end; correct?

(Tr. 645):

A. Yes, sir.

Q. And somewhat above that end and below the portion 18, you find, cross-secting the outlet, a number of either perforated plates or screens?

A. Yes, sir.

Q. In other words, you find dot-and-dash lines indicating that there are some openings through which water may be forced?

A. Yes, sir; and I think it shows up better in the patent drawings than in the photostats, because the photostats lose some of the detail, if I may point that out to the Court.

Q. Let me ask you what would happen if the water were "wild" or turbulent as it leaves the mixing portion 18, what would happen as it passes through the screen and through the constricted outlet, as it reaches atmosphere?

A. Well, the mixture of water and air that would be discharging from the faucet would be considerably slowed down by the screens, depending upon the mesh, and the constricted outlet would cooperate also to define a coherent, aerated stream discharging from the end of that faucet.

Q. And, in that respect, the constricted end of the Claflin patent, just below the screen, would serve very much as the nozzle i^2 in the Ferguson patent, which you referred to a moment ago?

(Tr. 646):

A. Yes, sir.

Q. Now I am going to ask you to turn to the Lockwood patent of Defendant's Exhibit 44, which will be designated as Defendant's Exhibit 44-4, and I hand you a chart, which we will mark as Defendant's Exhibit 44-4-A, and will ask you to explain simultaneously, if you will, both the patent and the chart.

(The chart referred to was received in evidence as Defendant's Exhibit 44-4-A.)

A. The Lockwood patent of 1916 is entitled "Apparatus for the Gaseous Treatment of Saccharine Juices." Initially, I would like to call attention to column 1 of the first page of the specification, line 31, which says:

"My invention, therefore, does not aim at the broad idea of treating saccharine juices with any particular gas or gases, but is directed to an improved apparatus for making that treatment more positive and effective."

Then I'd like to read the important object, which begins with line 53 on page 1, column 1, and reads as follows:

"The primary object of my invention, therefore, is to improve the conditions or methods heretofore employed, by causing the gases to come into more direct or intimate molecular contact with the particles of the mass of juice,

(Tr. 647):

rather than by surface contact and indirect partial absorption."

Now the particular figure of importance is the apparatus shown in detail in Figure 2 on the second sheet of the drawings; that is, Figure 2 shows the details of the apparatus for mixing the saccharine juices, which are liquid,

and the treating gases, which are gaseous.

Q. And is that the figure which you have on the chart?

A. Yes, sir, that is the figure on Defendant's Exhibit 44-4-A, which is colored.

Now the saccharine juices are introduced through the top of the casing by way of the tube 15, which enters into the portion marked 16, which is colored blue on Defendant's Exhibit 44-4-A. I might call attention to Figure 4, which gives a plan view of the lower end of element 16, which shows eight openings 13 through which the jets of liquid are discharged into the mixing device.

Q. Mr. Lettvin, will you give me the number of the cross-member through which the juices pass?

A. That is number 12, and it is in the form of a diaphragm or disc and it has eight of those holes 13 bored therethrough.

Q. Now those holes, you say, and the cross-member 12 are shown in plan view in Figure 4; correct?

(Tr. 648):

A. Yes; and Figure 4 is found on the first sheet of the drawings in the upper right-hand corner.

Q. Will you tell us the position of that perforated member formed by the plate 12 and the openings 13 with respect to the remainder of the device?

A. Let me put it this way: Disposed to the left and right of the casing, which, incidentally, is marked with numeral 1 in Defendant's Exhibit 44-4-A, is colored a casing. There is to the left a tubular arm 5 and to the right a tubular arm 4 through which gases are sucked in by the pressure drop that occurs as the liquid jets are discharged through the orifices 13. The jets are so arranged with an apparatus in the center of the casing 1, that is, the yellow casing 1, that the jets diverge outwardly and impinge upon the walls of the apparatus, which I will now describe—

Q. Just a minute. You stated that the apertures 13 project outwardly?

A. They appear to project outwardly, in the drawing they seem to be at an angle. And I might also say this: that in the description of the device, on page 3, column 1, beginning with line 29, it is stated:

"These jets may be directed to impinge against the inner conical wall of the first conical deflector, causing a splashing or diverting effect for more thoroughly mix-
(Tr. 649):
ing or commingling the particles of juice and treating gases, the gases sucked into the chamber 1 being also more positively drawn into and through the successive cones, in entrained relation with the juice, by the suction created by the juice itself passing therethrough."

Incidentally, I started to describe the structure within the casing, or within the chamber, which brought about the mixing, or the improved mixing, of the liquid and the gas, and that structure is shown in the form of three stacked cones which are of the converging type, with the lower terminal ends of the cones being generally cylindrical, and the uppermost of the cones is identified by numeral 17, and the second one below it is number 20, and the third one is number 23, and the cones are so arranged that the upper portion of one cone is spaced from the lower portion of the cone there above, so as to define substantially annular passageways between the cones through which the gas is sucked by the movement of the liquid through the device.

Q. Now when the liquid comes through the openings 13—and I think you said there were eight openings—would that liquid be in the form then of a plurality of jets?

A. Yes, sir.

Q. And would they be each open or suspended in such form that they might be referred to as a naked stream? (Tr. 650):

A. Absolutely, because they are completely, as they leave and until they hit the wall of the first cone, they are completely surrounded by the gases which are being sucked in by the aspirating action—and I use that word, even though it isn't in the specification, because that is what happens—the aspirating action of the liquid as it passes through the orifices 13 into the chamber.

Q. That is, the structure you see in Figue 2 is of the kind that may be referred to as an aspirator?

A. Yes, an aspirator or aerator; either name is all right.

The Court: Is there anything in the specification to indicate whether the bottom of those sections you referred to as three cones, whether the bottom of the cone has any screen or device whatever?

The Witness: No, sir, but I would like to point this out: that the lower portion of the casing, below the throat, again is constricted so as to confine the mixture of liquid and gas that issues from the mixing cones.

The Court: Is it not just a continuation of that cone form, the cone formed out of the tubular pipe, or whatever it is, the funnel below it?

The Witness: I don't believe so.

The Court: It seems to have a flange on each side of the bottom of the last cone. Doesn't the bottom of that (Tr. 651):
cone fit into the opening below it substantially?

The Witness: Yes, sir, it does.

The Court: In the same relation the previous cone did into the last one?

The Witness: Yes, it does, Your Honor.

The Court: Then it narrows down—there is no figure there, but it comes to a narrow channel at relatively the same distance as we have in each of the three preceding ones, is it, something like that?

The Witness: Yes, sir.

The Court: Now what do you say that produces; what is the effect of bringing it into a narrow channel down there, 29?

The Witness: The lower end of the casing would serve to confine the mixture of liquid and gas that issues from the mixing appagatus.

The Court: Into a narrow stream?

The Witness: Into a narrow stream.

The Court: Now what is the object of broadening that same outlet, as you go on down to 30; what is the object of broadening that outlet more as you go down—or does it say?

The Witness: I don't recall. You will find 30 in column 2 on page 2.

The Court: Line 71—beginning at 69: "This conical (Tr. 662):
throat 26 is also provided with a flanged apex 28 bolted to the flanged apex end of an inverted conical tube 29, terminating in one or more tubular sections 30 and 31, which latter are connected by an elbow 32 with the interior lower portion of a retarder or baffling tank 33."

By Mr. Freeman:

Q. In the patent, Figure 3 shows the conduit, the bottom of Figure 2, as pipe 30, and the retarder is that obstruction which has baffles leading in from the right and the left?

A. That is correct; and the purpose is to obtain intimate commingling between the gases and the liquid as they pass through the retarder shown in Figure 3 until

the processed saccharine juices are removed from the discharge outlet 40, which is at the upper end of the retarder.

Q. Now I am going to ask you to turn to—

Mr. Freeman: While we included the Aghnides patent in our book as 44-5, the Aghnides Patent 1,912,113, I am not going to burden the Court with any further explanation of it, but, of course, I do want to be able to refer to it in any written remarks, so I am going to pass that.

Q. I am going to ask you now, Mr. Lettvin, to turn to the Felten patent, which is the British patent, number 6 in the books, which will be designated as Defendant's Exhibit 44-6—
(Tr. 653):

The Court: Who is the patentee there?

Mr. Freeman: Felten. That is one we have had considerable comment about, and I am just going to ask him briefly to talk about it.

The Witness: Felton, No. 6,012, of 1909, is entitled "Improvement in or relating to Mixing Devices," and if I might read from the specification, page 1, beginning line 5:

> "This invention relates to a new mixing device chiefly intended for producing such mixtures from a gas or vapor-like substance and a liquid substance, in which either the one or the other substance or the mixture are unstable. A special important field of application for the new mixing device are ozone apparatus in which ozone-containng air is to be mixed as quickly and thoroughly as possible with a liquid to be oxinized for instance for the purpose of sterilising, since it is well known that ozone decomposes very quickly and loses its efficiency."

Q. Along with the Felten patent, I neglected to hand you a chart, which is a photostatic copy of the drawing,

which we will mark Defendant's Exhibit 44-6-A, and, in order to save time, you might refer to the chart as well as the patent in your further answer.

(The chart referred to was received in evidence as as Defendant's Exhibit 44-6-A.)

(Tr. 654):

A. Now, in Defendant's Exhibit 44-6-A we have maintained the same coloring of parts that was maintained in the earlier colored charts, in that the casing which defines the chamber in which the mixing of the gas and liquid takes place is colored yellow, and the structure which defines the liquid jet-forming meaning is colored blue, and the resistance means, or baskets, within the mixing chamber are colored red, and there are four baskets f, as we have here positioned within the mixing chamber.

Now I might point out that the mixing chamber e extends all the way up to the lower surface of the jet-forming means, which is colored blue, and the chamber into which the jet of liquid is discharged is of greater size than the size of the jet-forming orifice, which is designated by the letter c. The air is drawn in through conduit d, into the mixing chamber adjacent the top of the mixing chamber e, and the mixture of liquid and gas—and incidentally, the specification states that the gas is ozone-containing gas, that is, air with ozone in it—mixes within the mixing chamber by passing through the baskets f and discharges therefrom in a coherent, aerated stream. Incidentally, the lower end of the casing is equipped with a constricted outlet, g.

The Court: Where does it say that it comes out as an

(Tr. 655):

aerated stream?

The Witness: It does not say so, but I think the demonstration illustrated that it came out—

The Court: I was just wondering if it said anything in there.

The Witness: No, sir, there is nothing in the specification.

The Court: For the information of the Court, I notice here in your colored chart you have f shown in different shape or form. Is that in accordance with the way the drawing is in the Felten patent?

The Witness: Yes, sir. This chart, Defendant's Exhibit 44-6-A, is a photostatic copy.

Mr. Freeman: None of these are drawings that were made at all; that is a photostatic copy of the patent drawing itself.

Q. (By Mr. Freeman): Now, Mr. Lettvin, if I were to take the Felten patent, and water came out of it in turbulent or in an incoherent stream, what patent would I have to turn to, in the prior art, to restrict or contain the water so that it would come out in a coherent stream?

A. The references that we have thus far talked about—

Q. No, I am asking you if you have any anti-splash device patents.

(Tr. 656):

A. Yes, sir.

Q. Which one is it in the book of patents?

A. Number 7, the Purser. Patent number 7 is a very simple device. It is number 136,663, it is from Great Britain, and the title is "Improvements in or relating to Splash Preventers for Domestic and other Taps." That would be faucets and the like.

Turning to the single sheet of drawings of the device, the splash preventer is shown as including a body, a, through which the liquid passes, and having therein one or more screens identified by c, and a converging and, therefore, constricting outlet b below the screens. And I might

point out that in the specification, on page 3, beginning with line 13, it says, beginning in the middle of a sentence: "... a disc or discs—"

The Court: You are beginning in the middle of a sentence?

The Witness: Let's begin at line 11:

> "Between the lower extremity of the tubulus a and the lower side of the annular channel b^3 within the upper part of the nozzle b, a disc or discs of wire gauze may be incorporated to function as a strainer. The depending part of the metallic nozzle b may be of taper form as in the previous embodiment."

(Tr. 657)

Q. (By Mr. Freeman): That portion that you read refers to the device wherein the wire gauze functions as a strainer. Is there any difference, in so far as the term "strainer" or "anti-splash device" or "anti-spout device"?

A. No, sir; and I was just going to say, before you asked your question, that, if you will recall, in the Aghnides patent, number 5 of the book of patents—

Q. Is that the British patent?

A. Both the American and the British patents, the American patent being 1,912,113, and the British patent being 375,066, which is number 9 of the book of patents, that is, Defendant's Exhibit 44-9, both devices refer to the use of screens or wire gauzes as an anti-splash device. Now, incidentally, in the American patent, which is 44-5—

Q. On page 1, line 95, you find what?

A. It states: "Preferably the outlet 11 will be provided with a wire gauze acting as an anti-spout device.

Q. Now what do you find in the corresponding British patent with respect to the term "anti-spout device"?

A. Well, in the British patent, which is Aghnides 375,-

066, which is Defendant's Exhibit 44-9, on page 1, beginning with line 104, the specification states: "Preferably the outlet 11 will be provided with one or two wire gauzes acting as anti-splash device."

(Tr. 658):

To me, the words "anti-spout" in the American patent, and "anti-splash" in the British patent mean the same thing, because the gauzes are positioned at the same place on the same device.

Mr. Freeman: In connection with the Felten patent, Your Honor, we did not plead in this case the Fuss patent, about which there was some fuss made yesterday and again this morning—

The Court: Can't we agree not to fuss about it any more?

Mr. Ely: I might want to fuss about it.

Mr. Freeman: I was going to ask Mr. Lettvin to refer to that briefly, not for the purpose of anticipation, but for the purpose of showing the state of the art. The plaintiffs in this case are not surprised about it, because they had copies of it and it was used in the Chicago suit and the Court of Appeals there referred to the Felten patent and they referred to its counterpart in the United States Fuss patent, so I am not injecting anything in the case now as a surprise.

Mr. Ely: I have no objection to your talking about the Fuss patent.

The Court: What is the number of it?

The Witness: It is not in here, Your Honor.

(Tr. 659):

Mr. Ely: You pleaded it in your answer.

Mr. Freeman: That's better than I thought. I still repeat my statement that it is not for the purpose of anticipation, but for showing the state of the prior art.

May we have a short recess at this time?

The Court: Yes, sir.

(Brief recess taken.)

Mr. Freeman: I am going to ask the Clerk to mark the Fuss patent as Defendant's Exhibit 44-11.

(The patent referred to was received in evidence as Defendant's Exhibit 44-11.)

Q. (By Mr. Freeman): Do you have a copy of that patent, Mr. Lettvin?

A. Yes, sir.

Q. I am going to ask you, just briefly, to tell us what you find in the Fuss patent. First, does it relate to what we would call a domestic drinking-water system?

A. Yes, sir.

Q. And where do you find in the patent any statement that justifies your last answer?

A. On page 1 of the specification, in the first column, the last two lines, beginning at line 54.

Q. Will you read it?

A. (Reading) "In the example of the system for treating a liquid with ozone, illustrated in the drawings the (Tr. 660):
appartus for mixing the ozone and liquid is provided with a tubular plug 1 whereby it can be connected to a suitable water supply, for example, to a faucet of the water system of a building."

Q. Now do you find in the drawings any illustration of a building with a plurality of water faucets, showing, or exemplifying, at least, diagramatically, a water system in a building?

A. Yes, sir.

Q. Which figures is that?

A. On page 1 of the drawings, Figure 8, which is the right-hand drawing, there appears to be a building having

three sinks and three faucets positioned above each of the sinks on each of three floors, and the faucet is numbered 34.

Q. Now is it fair to say that the patent to Fuss has for its object the obtaining of better or purified drinking water?

A. Yes, sir. That is best pointed out in the specification, page 1, column 1, beginning line 9, if I may read it:

"This invention relates to improvements in systems for treating liquids with ozone for the purpose of oxidation and destruction of germs, and the object of the system is to provide a system by means of which such (Tr. 661):

oxidation and destruction of germs takes place in a particularly effective way."

Q. Now, I notice in the general object that you just read, in line 10, the term "treating liquids." Can that be water?

A. Yes.

Q. And where do you find that justification?

A. Well, that goes back to the sentence that I read previously; and, if I may just quote from the middle of the sentence, or, if you want me to read the full sentence—

Q. No.

A. It says ". . . can be connected to a suitable water supply, for example, to a faucet of the water system of a building."

Q. Now will you tell us briefly about the Fuss patent—and I am going to call the Court's attention to the fact that Figures 2, 3, 4, and 5 of that patent are, I would say, substantially duplicates of Figures 1, 2, 3, and 4 of the British Felten patent.

The Court: I had noticed the similarity.

A. There are two forms of device shown in the Fuss patent, the one in Figure 1, and the one that you have

just referred to in Figures 2 to 5, inclusive. Now the one in Figures 2 to 5, inclusive, is the one that is shown (Tr. 662):

mounted in position at the end of a tube, 11, in Figure 6, and the tube 11 is for the purpose of supplying the ozone to the water that is passing through the device.

Q. Now what is that device fastened to, that is referred to, I think, by the reference numeral 24 in Figure 6?

A. 24 is a faucet of a building.

Q. You recognize that—

The Court: I don't see any figure 24.

The Witness: That is 28.

Mr. Freeman: I just misread it; I can't see it.

Q. (By Mr. Freeman): You find a faucet, do you not, in Figure 6?

A. Yes, sir.

The Court: Where is it?

The Witness: Right at the right.

The Court: I see that. What do you call those numerals there?

Q. (By Mr. Freeman): What is the designation of the faucet? My copy, which is photostatic, is rather hard to decipher. Will you turn to the specification?

The Court: It appears to be 24.

The Witness: It appears to be 24, on the drawing, but the specification says it is 28, the faucet.

Q. (By Mr. Freeman): Where do you find that refer-

(Tr. 663):

ence to a faucet as being 28?

A. For example, page 2 of the specification, column 2, lines 75 to 78: "The duct 15, 16, 17 and 18 communicates with the ejector 3, 11, which, in the example illustrated, is located at the discharge side of the faucet 28."

Q. Now I note in figure 2 of the patent that the lower end has the reference numeral II thereon.

A. Yes, sir.

Q. Do you find the same reference numeral on the lower end of Figure 6?

A. Yes, I do.

Q. Now just tell us what the patentee states is his objective in getting ozone into the water system.

A. Well, I believe that was stated earlier, in page 1, column 1, for the purpose of oxidation and destruction of the germs.

Q. Now is it true that when water passes through the faucet 28, using Figure 6 as illustrative, that an ozonator is brought into operation?

A. Yes, sir.

Q. How is that ozonator brought into operation? Just tell us that briefly.

A. I will tell you briefly, from what I have read in the specification, in my own words. At the lower end of the (Tr. 664):
faucet 28 is the device shown in Figures 2 to 5, inclusive. Now when the water is turned on there is created in the tube 11 a partial vacuum, or a suction, and that suction operates to close a valve—I'm sorry, not close, but to open a valve, or move a valve—let me put it that way—move a valve which is located in the apparatus, designated by the casing for the apparatus.

Q. Is that apparatus an ozonator?

A. Well, there is a valve in that apparatus and there is also an ozonator in the apparatus, and when the suction moves the valve it operates to turn the ozonator on, and the moment the ozonator is turned on ozone is supplied through the means of the ducts, and I believe I gave those numbers before as 15, 16, 17, and 18. The ozone passes

through the ductwork and through the tube 11 to the mixing device, which is shown at the lower portion of the faucet.

Q. I think that reference you referred to as tube 11 is actually tube 18.

A. Tube 18; you are right.

The Court: Are you still referring to Figure 6?

The Witness: Yes, sir, Figure 6.

The Court: I don't see any 18 on mine—yes, I do.

The Witness: It's the pipe. It's extending downward (Tr. 665):

in the upper part of Figure 6.

The Court: Where in the portion, whatever the product is, where it is discharged; where do you get it out?

The Witness: It goes out of the lower end, or through the nozzle 11 at the lower right-hand side of Figure 6.

The Court: Where does the water come in at?

The Witness: The water comes from the faucet 28, of which you can see the handle.

The Court: I see the handle, but where does it come from?

The Witness: It comes from the water system of the house.

The Court: And, in this figure, what is it that brings water into that contraption?

The Witness: That is not shown.

Mr. Freeman: In other words, Your Honor, in making patent drawings, you show the source of supply, and all they show here is the pipe and faucet; they haven't gone back to any main or anything of that kind.

The Court: As I understand it, the drawing beneath goes to the part of Figure 6 at the top; does it not; that tube connects with that tank on the upper part of Figure 6?

The Witness: Yes, sir.

The Court: It doesn't show any opening in this faucet (Tr. 666):

for water, but it would come in there where the pipe seems to terminate in the handle?

The Witness: No, sir; in Figure 6 of the faucet is shown broken off at the left-hand end.

The Court: Do you see that (indicating)?

The Witness: Yes, sir, I see that. That means the faucet is connected somewhere to a source of supply of water.

The Court: That is what I just asked you—the only place I can see where water comes in.

The Witness: That is where the water comes in, and there's a valve that controls the movement of the water into the faucet.

The Court: And it goes down into that channel?

The Witness: Down into the mixer member 3, and discharges at the outlet end 11.

Q. (By Mr. Freeman): In other words, when the faucet, or the petcock is in open position, water will pass in the direction from left to right and downward, as in an ordinary faucet; correct?

A. Yes, sir.

Q. And at the lower end of the faucet is screw-threadedly connected there with a device corresponding to Figure 2 of the Fuss patent?

A. Yes, sir.

The Court: There's no use to repeat and go back over (Tr. 667):

what he's already been over. I was just trying to get straightened out about the water inlet and the final outlet.

Q. (By Mr. Freeman): I would just like to get clear that the pipe 18 in Figure 6 connects up to the right-hand side of Figure 2; is that correct?

A. Oh, yes, to the duct shown extending laterally from the right-hand side of Figure 2—you are correct—and ozone is supplied finally by the ozonator through the duct 18 to the mixer 3 mounted at the lower end of the faucet.

Q. Now, in connection with Figure 8 of the Fuss patent, do you there find a single ozonator, or apparatus for making ozone?

A. Yes, sir.

Q. Do you find that then connected to a plurality of drinking taps or faucets?

A. Yes, sir.

Q. And do you find that when any one of the three faucets is open the ozonator will be brought into operation for permitting ozone to be drawn into it and mixed with the water?

A. That is what the specification describes.

Q. Now, in so far as the supply of ozone, is that a supply that continues to be replenished as the device operates?

A. Continuously; as ozone is being drawn off, more ozone is supplied to the faucets.

(Tr. 668):

Q. So that it only takes a partial vacuum to start the device operating and thereafter free ozone from the ozonator will flow into the drinking water?

A. That's correct.

Q. And how is that ozone drawn into the drinking water; what brings that about?

A. The suction induced by the mixing apparatus shown in Figure 2.

Q. You used the term "suction induced." Is that the same as a partial vacuum?

A. Yes.

Q. And isn't it a fact that the patentee refers to the duct too as a suction duct?

A. Yes, on page 1, line 80.

Q. And that he likewise refers to that same portion as a partial vacuum being created within the suction duct tube; correct?

A. Yes, sir.

Q. So that the structure of the Felten British patent, which is shown in the Fuss patent Figures 2 to 5, brings in ozone from a continuous source, or a replenished source, as distinguished from vacuumizing a tank?

A. That's correct.

Q. And when I say "brings in ozone," I am referring (Tr. 669):

specifically to the Fuss patent.

A. That's correct.

Q. I believe you have already talked about the Purser patent, which is an anti-spout or anti-splash device.

I am now going to ask you to turn to the Battersby patent, which is Exhibit 44-8, and I hand you a chart which we will mark as Defendant's Exhibit 44-8-A, and will ask you to explain the patent and the chart at the same time, in order to save time.

(The chart referred to was received in evidence as Defendant's Exhibit 44-8-A.)

A. The Battersby patent of 1929 is entitled "Improvements relating to Apparatus for Aerating and Blending Liquids." The early portion of the specification is particularly significant, and may I direct attention to the complete specification, beginning on page 2, at line 71; and may I read:

"This invention relates to apparatus for aerating and blending liquids, and in particular for aerating water and blending with it some kind of flavouring to make a hot or cold drink."

I would like to also read on that page, in the righthand column in the lower half, beginning with line 99:

"In the preferred apparatus, the primary liquid is forced through a jet consisting of a perforation at the apex of a (Tr. 670):
cone-shaped nipple and arranged centrally in a pipe, the walls of which are perforated to admit air at some distance in front of the aperture; the flavoring liquid is thus blended and aerated and received in a receptacle, usually a drinking glass, through an outlet to the pipe which may be shaped to prevent undue splashing."

Q. Reference there is made to the primary liquid. What do you understand to be the primary liquid, as there stated?

A. Water.

Q. And do you find that because of the statement that you earlier read, that it was particularly for aerating water?

A. That's correct.

Q. Will you proceed to tell us just how the device functions?

A. Calling attention to the colored chart, Defendant's Exhibit 44-8-A, Figure 2 is the apparatus which performs the aerating function, and there the casing of the device, which surrounds the mixing chamber, has been colored yellow and the upper end of the mixing chamber is bounded by a nozzle 1 which has the nozzle aperture m therethrough. Now the walls—

Q. When you say a nozzle aperture, you mean an opening?

(Tr. 671):

A. An opening, that is correct. His specification used the term nozzle aperture. That is an opening in the nozzle 1.

Q. A single opening?

A. A single opening.

Q. Would it be fair to say that that particular structure comprises a member extending clear across the water passageway?

A. Yes, sir.

Q. Could I call it an apertured diaphragm?

A. Yes, containing a single aperture.

Q. Proceed.

A. Below that nozzle 1 there is an enclosed space in which there are four air openings j. They are referred to as air intakes in the specification. While only two of them are shown in Figure 2, the specification states that those holes are drilled in opposite walls and, therefore, there are two pairs and there are four air-inlet openings. Now those air-inlet openings are spaced below, to use the term that was used before, the apertured diaphragm. As the jet of water passes downwardly from the nozzle aperture m it sucks in air through the air intakes j.

Q. Is that water coming in at substantial velocity?

A. Yes, sir.

Q. Why?

(Tr. 672):

A. Because you have a small orifice and the upper portion of the device is connected by means of union g on your tap and you have a large body of water behind that aperture and, depending upon the pressure, you are getting fluid through that aperture at substantial velocity.

Q. You said "behind." You mean upstream of the apertured diaphram?

A. You are correct.

Q. Where are the openings or the air inlets with respect to the aperture or nozzle of the Battersby patent?

A. They are below the nozzle aperture.

Q. Downstream?

A. Downstream, yes, sir.

Q. Are they closely adjacent to the particular place where there is a pressure drop as the fluid passes from the conduit g through the nozzle into the portion 1?

A. Closely adjacent is rather vague. I notice that the upper air inlet j is, of course, closer to the nozzle aperture than the lower air intake j.

Q. What does the patentee state with respect to the construction we are now talking about; and I direct your attention to page 3, about line 35, "the pressure union g is screwed to the outlet;" will you describe the structure that you there find?

(Tr. 673):

A. That's correct; he describes there what I have thus far described. Now, in the functioning of that apparatus, may I read, beginning with line 45 on that page?

Q. Proceed.

A. (Reading) "With the appartus so far described, if the water is turned on, a downwardly directed jet or spray is formed from the nozzle m in which the water is finally subdivided and which moves at a high velocity so as to draw in air laterally, and if this jet is received in a receptacle, the water would be highly aerated and would remain aerated for an appreciable time."

Q. Now will you proceed with the further description wherein blending of the aerated water with a syrup or other liquid is brought about?

A. Downstream of the portion of the pipe h which contains the air intake j there is a conical reduction, which is

referred to as n—and I am referring to Figure 2—and just off laterally from that conical reduction there is a tube s which leads to a container p, which is adapted to receive fruit juices, and, incidentally, a control valve s is disposed in the tube—I think I referred to the tube as "s" before, and that is incorrect; the tube that leads from the syrup container is tube o and the control valve is s—there's a valve s which may be used to either shut off the (Tr. 674):

flow of syrup to the device or opened up to permit syrup to flow into the aerating device.

Now below the junction of that conduit o with the portion of the pipe n there is a peg or stem referred to as u, and that peg or stem extends into the inside of the pipe h and is adapted to have the downwardly directed liquid impinge there against to effectuate better mixing of the water and the ingested material. When I say "ingested," that is the material that is brought in by the operation of the device.

Now below the peg or stem there is generally indicated by the letter t an anti-splash device; and if I may read from the specification, on page 3, lines 82 to 85, the specification states:

"Between this"—and when they refer to "this," I believe they mean the anti-splash device t which had previously been referred to—"Between this and the junction with the pipe o, a flow adjuster is provided which may be of any desired kind, but is shown, as an example, as an adjustable screw u the stem of which is about one half the diameter of the inside of the bottom part of pipe h. This adjuster, when desired, may be moved towards or across the centre of the pipe h so that the liquid stream will impinge upon the stem, thus causing the blended liquids to be discharged through the outlet of the pipe h in a foam-

(Tr. 675):
ing state. The result is a blended drink highly aerated which is received in the glass v."

Q. Now, Mr. Lettvin, you have so far described the device, in the parts that you have described, as applicable for aerating a mixed drink of some kind, syrup and water; correct?

A. Yes, sir.

Q. Did you find anything in the patent that tells how that device might be used for ordinary domestic drinking water in a home?

A. Yes. On the same page, page 3, column 2, beginning with line 113:

"Again, of course, the part of the apparatus from the union downwards"—may I parenthetically insert that is of Figure 2—"from the union g downwards can be attached to any ordinary domestic water tap for household use."

Q. And what does he say in the next two lines with respect to plain drinking water?

A. (Reading) "When plain drinking water is aerated the visible air bubbles soon disappear, although if the aerated water is examined under a powerful lens the air is seen in suspension for some time afterwards. If, however, any fruit juice syrup, cordial, or spirit is introduced (Tr. 676):
the aeration is held for a longer time according to the density and colloidal properties of the blended liquids."

Q. Do you understand from that portion you have read that if you wanted to use the device for aerating water in a home by securing it to an ordinary water tap or faucet that that could be accomplished?

A. Yes, sir.

Q. And you likewise understand that if you did not want any syrup you could shut the control valve s, and in that case there would be dispensed only aerated water?

A. Yes, sir.

Q. Now you do find in Battersby a device which is specified for attachment to a water faucet or tap; correct?

A. Yes, sir.

Q. And likewise an apertured diaphragm containing a single opening, extending across the passage of water from the faucet downward?

A. Yes, sir.

Q. And do you find a chamber below that aperture, enlarged with respect to the aperture, which receives water at high velocity?

A. Yes, sir.

Q. Do you find in Battersby a structure wherein, due to the high velocity of the water and the pressure drop at (Tr. 677):
the aperture, air is sucked into the chamber?

A. Yes, sir.

Q. Do you find within the chamber, projecting from the walls thereof, a mixing device against which the water impinges?

A. Yes, sir.

Q. Do you find that impinging member, or the member which projects inwardly from the wall, that it is adjustable?

A. Yes, sir.

Q. Now if I found that I was getting too much resistance in the breaking up of water, due to the member u, what would I have to do to get less resistance?

A. Withdraw a portion of the peg or stem u outwardly from within the pipe 1.

Q. And, if the reverse were true, what would I have to do?

A. Well, you screw u in further until you get sufficient resistance.

Q. The questions that I have just asked you are explained in the Battersby specification?

A. Yes, sir.

Q. They are not of your own concept or imagination?

A. No.

Q. And below the member that extends in from the sidewall, against which the jet of water impinges, you find (Tr. 678):

what Battersby calls an anti-splash device?

A. Yes, sir.

Q. Is it your understanding that an anti-splash device would help bring about a more coherent stream?

A. Yes, sir.

Q. Now would you get from a Battersby device an aerated stream of water?

A. Yes, sir.

Q. I next call your attention to the Solomon patent, which is Defendant's Exhibit 44-10, and there has been some explanation about it, but I am first going to ask you to tell me its title.

A. The title is "An Improved Device for Aaerating a Liquid after it has Passed Through the Nozzle of a Tap."

Q. Now will you proceed to discuss the Solomon patent; and this time I am going to ask you to stick to the patent instead of any chart.

A. I first would like to call your attention to the complete specification, which begins on the bottom of page 2, and may I read from the statement beginning on line 96:

"The invention relates to a device, adapted to be con-

(Tr. 679):

nected to the nozzles of taps, particularly the nozzles of beer taps, and the nozzles of beer engines, by means of which liquid after it has passed through a nozzle will be aerated and a foam or froth produced."

Q. I wish you would turn first to the type of device shown in Figures 1, 2, and 3.

A. The simplest form of the device is shown in Figures 1 to 5, inclusive, and it includes a member 1, which is solid

at the top and hollow on the inside, and the solid part at the upper end of the device has four vertical throughways or passageways, numbered 4, extending therethrough. They can best be seen in Figures 3 and 4. Now, alternating with those four vertical passageways are sort of right-angle-shaped air-inlet passageways, which are designated by the numbers 5 and 6, as best seen in Figure 2.

Q. Those openings 5 and 6, 6 is the horizontal portion and 5 is the vertical portion?

A. That's correct. As explained in the specification, the passageways 4 are for the liquid that passes through the aerator; the passageways 6 and 5 are the passageways for the movement of air down into the mixing chamber, which is the hollow part of the device. Furthermore, the wall of the device carries four pegs numbered 8 which are aligned one with each of the vertical passageways 4, so that the jet of liquid passing from the passageway 4 im-

(Tr. 680):

pinges upon one of the pegs 8 and, since there are four passageways numbered 4, there are also four pegs arranged to receive the four jets of liquid discharged.

Q. Mr. Lettvin, I notice that in Figure 1 there is shown in dotted lines a member or element referred to by the reference numeral 9. Do you know what that is?

A. That is a connector, for connecting to a source of fluid. Let me see if I can find that in the specification. I don't spot that right offhand. Oh, yes, page 3, line 124: "9 indicates part of a length of rubber tubing by which the device may be attached to the nozzle of a beer tap."

Q. Would it make any difference if, instead of using a rubber tube, you used a screw-threaded union for connecting it to the faucet that had screw-threads to coincide?

A. None whatsoever.

Q. In other words, 9, in your opinion, is the equivalent of a faucet end?

A. Yes, sir.

Q. And the device shows on the outside some corrugated or screw-threaded portions for better attaching to the element 9?

A. Yes, to the rubber connector.

Q. And the device wouldn't work any different whether the water was fed in through a rubber tube or through a brass faucet?

(Tr. 681):

A. No; that's correct.

The Court: We will take a recess until nine-thirty tomorrow morning.

(Thereupon, at 4:55 p. m., an adjournment was taken until 9:30 a. m., Thursday, October 13th.)

THURSDAY, OCTOBER 13, 1955

(The trial was resumed at 9:30 a. m., Thursday, October 13th, pursuant to adjournment on October 12th.)

The Court: All right, gentlemen, proceed.

Mr. Ely: If Your Honor please, I would like to put some dimensions in the record. We had a chance to measure some devices that were put in, and I would like to put those dimensions in, if I may. It has to do with the Felten models.

The Court: Just a minute. When we recessed court Mr. Lettvin was on the witness stand.

Mr. Freeman: It's agreeable to me, but I don't see why we can't do this either on your rebuttal or sometime.

The Court: Let's go along with the witness.

(Tr. 682):

NORMAN LETTVIN resumed the stand and testified further as follows:

DIRECT EXAMINATION (Con't)

By Mr. Freeman:

Q. Mr. Lettvin, yesterday, I think, you were talking about the first form, or the first few figures, of Solomon; correct?

A. That's right.

Q. Now will you continue with your explanation of the Solomon patent?

A. Yes. I believe I described the general construction of the device—

The Court: Don't repeat, now, what you have already gone over.

The Witness: No, sir, but I believe that two statements were not brought in at that point to complete the description of the operation of the device.

Q. (By Mr. Freeman): All right, proceed to put that in.

A. Just two statements. First, on page 3, column 1, begininng with line 30 and running to line 42, may I quote—and he is here describing his device:

"The walls or sides of the lower or hollow part of the cylinder are provided at a suitable distance below the upper solid part of the cylinder with holes into which are driv- (Tr. 683):
en pegs of suitable length which converge towards the center or axis of the cylinder and are transversely disposed with respect to the passages that extend from end to end of the solid part of the cylinder, and serve as a means for breaking up the liquid as it emerges from the lower ends of said passages."

Q. Now those pegs which serve as a means for breaking up the liquid are positioned below the inlet openings where the air comes in; correct?

A. That's correct.

Q. And those pegs project in from the sidewalls?

A. That's right.

The Court: Aren't they demonstrated by Fig. 16?

The Witness: They are shown as Figure 16, but presently we are discussing Figures 1 to 5, which is the first form of the device, which is the simplest form of the device.

The Court: They are also shown in Fig. 5?

The Witness: That's right, as elements 8.

Q. (By Mr. Freeman): I am going to ask you, those pegs are in alignment with the jet of water that comes through each of the orifices or openings—and I think the reference numeral is 4?

A. That's correct.

(Tr. 684):

Q. So that there is shown in Figure 5 four such pegs that converge each toward the other?

A. That's correct.

Q. And there are likewise shown in Figure 4 four openings which are numbered 4, reference numeral 4, and the four openings are alignment with the pegs 8; is that correct?

A. That's correct.

Q. And is it true that the air-inlet openings shown at 5 and 6 in Figure 2 are spaced in between the openings 4?

A. Yes, sir. I believe the specification uses the term "alternately disposed."

Q. Now is it true that as the jets of liquid pass out of the openings 4 into the enlarged open space or hollow part, I believe Solomon refers to the portion which includes the pegs 8, will there be a suction at that particular point?

A. Yes.

Q. And that suction draws in air from atmosphere surrounding the unit?

A. Yes.

Q. And are the streams, the four that pass through the openings 4, are they, with respect to the surrounding air, within the chamber in the form of naked streams?

A. Yes. May I also add that, because the holes are shown as lying immediately adjacent the wall of the casing 1, there will be perhaps a line contact only between (Tr. 685):
each of the jets and the wall of the casing, but otherwise they are completely surrounded by air that is drawn in.

Q. And what happens to the air and water as we move downstream within the Solomon unit at the time the pegs 8 are engaged?

A. May I read that to you from the specification?

Q. Make it as short as possible.

A. Yes. That is the other portion I was going to read, at the end of page 3, the last three lines, and running onto page 4:

"When a tap provided with the device is opened liquid will flow through the set of passages 4 that extend from end to end of the solid part 2 of the cylinder 1 and will impinge on the transversely disposed pegs 8, causing turbulence of the liquid. At the same time air will be drawn through the other set of passages 5 and become mixed with the liquid, thereby aerating same and causing a foam or froth to be formed on the upper part of the liquid when the latter is drawn off into a glass or vessel placed below the device."

Q. Now, Mr. Lettvin, I am going to ask you, as an engineer, would it make any difference whether you drove pegs in from the wall or you took a solid body and cut out a portion so as to provide pegs integral with the body.

(Tr. 686):

A. None whatsoever.

Q. Would it make any difference if you provided interrupted shoulders extending in from the body instead of pegs?

A. None whatsoever.

Q. And it wouldn't make any difference whether those shoulders were cut out of a solid piece of bar stock or were put in by some attachment?

A. That's correct.

Q. Would it make any difference, so far as the impingement or striking of the jets of water—I shouldn't say water; liquid—in the Solomon device, if we had an annular shoulder extending inwardly from the walls of the part marked 1 in the drawings?

A. I might have to say that if you had the annular shoulder in the casing, in order to preserve the central outlet, you would then have to incline the jets so that they would hit the wall of the casing, or make the casing even larger and preserve some sort of central hole.

Q. In other words, what we have in the pins 8, or pegs 8, as Solomon calls them, is an obstruction to the flow of water; correct?

A. Correct.

Q. And that obstruction, his specific form, causes the breaking up of the water and mixes it with air; is that cor-

(Tr. 687):

rect?

Q. Is that what you gather from the words you read a moment ago when the patentee states: "At the same time air will be drawn through the other set of passages 5 and become mixed with the liqlid, thereby aerating same"?

A. Yes, sir.

Mr. Freeman: I want the record to show I did not read the complete sentence, I stopped a little short of it, but I was reading only a part of what you referred to earlier, Mr. Lettvin.

Q. Now I note in Figure 7 that the pegs 8 below the openings 5 are much closer to the openings than are the pegs 8 in Figure 2. What have you to say in that regard?

A. In that regard, the closer spacing of the pegs 8 to the outlet ends of the liquid passages would contribute to a more thorough mixing of the liquid and air within the device.

Q. Is that because the further away you get from the orifice the greater the spreading out of the jet?

A. Precisely. When a jet leaves an orifice it begins to spread out and the further away you get the more spreading out occurs?

Q. Is that like a garden hose, when you start with a jet of one diameter it spreads out as it mixes with atmosphere?

(Tr. 688):

A. That's a pretty good analogy.

Q. Can you tell me, from just a visual inspection with the eye, whether or not pegs 8 in Figure 2 appear to be smaller in diameter than the pegs 8 in Figure 7?

A. The pegs in Figures 7 and 8 appear to be larger than the pegs in Figures 2 and 3.

The Court: They are both based on a different scale altogether?

The Witness: Yes, sir.

The Court: They are proportional, though, aren't they?

The Witness: Yes, sir.

The Court: They are proportional in each one, but the scale in each figure differs from the scale or plan in the other?

Mr. Freeman: What I was trying to arrive at here was that the pegs were much closer to the orifices in Figure 7 and, therefore, the liquid does not have to pass as far, and Figures 2 and 7 illustrate proportioning.

The Court: All right.

Q. (By Mr. Freeman): Now will you tell us quickly the difference between Figure 2 and Figure 7? Do it just as quickly as you can.

A. Yes. May I just point this out: In Figures 7 and 8 there is added to the device that is substantially shown in Figures 2 and 3 an apparatus which is described in the specification as an anti-drip device, and that additional structure is shown in the upper portion of the body. It is added upstream, or above the point where the liquid discharges from the vertical passageways in the solid portion of the body. Very briefly, there is a recess within the upper portion of the body within which is positioned a light spring 12 and a valve member 11. The uppermost portion of the device has an apertured disc 13 positioned therein, and the valve member 11 is adapted to abut and close the orifice 14 therethrough when the liquid is drawn off. The spring 12 serves to bias the valve number 11 upwardly. Might I point this out: that in the original provisional specification number 21,752, which was filed August 3, 1932, the description encompasses principally Figures 1 to 5. Thereafter a second provisional specification was added as an improvement, and that was number 24,024, and filed on August 27, 1932. So, from that, I deduce that the improvement of the anti-drip device was merely an improvement over the simplest or basic form of the device shown in Figures 1 to 5. (Tr. 689):

Q. I notice you used the words "a light spring."

A. Yes.

(Tr. 690):

Q. Where do you get that justification?

A. From the specification.

The Court: That is all described on page 4, in the first column there, isn't it, beginning with line 11?

The Witness: Beginning there, that's right.

The Court: And going on down to line 30?

The Witness: Approximately.

The Court: It continues on down through that column?

The Witness: That's correct.

The Court: I see it is mentioned down there as low as line 48.

The Witness: The words "light coil spring 12" are found particularly on lines 23 and 24 of the first column on page 4.

Q. (By Mr. Freeman): Now, Mr. Lettvin, if you were operating a device at thirty pounds pressure, would you say that a spring of twenty-five pounds, which gave you a five-pound differential, for operating characteristics, would you call that a light spring?

A. No.

Q. If you took a device and considered the drawings as full size, as shown in Figure 7, do you think it would take a twenty-five pound spring pressure to close the member 11 against the aperture 14?

(Tr. 691):

A. No. May I say that the spring must exert a force at least equal to the weight of the valve member 11 plus whatever additional force is desired to close that.

The Court: As I understand this device here you are talking about, that member 12, its object is to cut off the drip?

The Witness: When you have got it turned off.

The Court: When you have the pressure turned off?

The Witness: That's correct.

The Court: And it doesn't take much, with the pressure turned off, to push it back in position?

The Witness: Correct; all that spring has to exert is the weight of the valve member.

Q. (By Mr. Freeman): Mr. Lettvin, in connection with Figures 7 and 8, I am going to hand you a chart, which I am going to ask the Clerk to mark as Defendant's Exhibit 44-10-A, and will ask you to explain it as quickly as you can, in view of what you have already stated with respect to Figures 7 or 8 of the Solomon patent.

(The chart referred to was received in evidence as Defendant's Exhibit 44-10-A.)

The Court: Show me the coloring there, and then I think we can understand it.

The Witness: The yellow is the chamber in which the mixing of the liquid and air takes place.

The Court: That is true in both Figures 7 and 8? (Tr. 662):

The Witness: That's right. Incidentally, Figure 7 is at about a forty-five degree angle to Figure 8, and that's why the pegs appear a little differently.

The Court: Go ahead. The color scheme is what we are talking about now.

The Witness: The pegs in the path of the liquid, for mixing liquid and air, are number 8, and they are colored red.

The Court: In both figures?

The Witness: In both figures. In Figure 8, on the right-hand side of the chart, the lower ends of the passage-ways through which the liquid is discharged—

The Court: Into the chamber?

The Witness: Into the mixing chamber—are colored blue. On the left-hand side, in Figure 7, the apertures through which air is drawn into the chamber from outside

the body are colored orange, and, at the upper end of the device, the restricted orifice in disc 13 is colored purple.

The Court: And that is true in both figures?

The Witness: In both figures, yes, sir.

The Court: This one over here on the right-hand side, Figure 8, what did you say the green there represents?

The Witness: When you say the green, those are blue, but they represent the lower ends of the liquid passageways through which the liquid is discharged into the chamber.

(Tr. 693):

The Court: Where are the air vents shown in Figure 8; what color?

The Witness: They are not shown in Figure 8. They are shown in Figure 7 in orange.

The Court: I see.

The Witness: Figure 8 can not show the air vents because they are hid behind the liquid passageways, because they are alternately disposed. You have to turn the body about forty-five degrees before you see the air vents. Similarly, in Figure 7 you see only the air vents, but don't see the liquid passageways.

Q. (By Mr. Freeman): In other words, if on a circle, the air vents and the liquid inlets are alternately spaced?

A. Right.

Q. And in Figure 7 the section was taken through the two opposite air inlets; correct?

A. That's correct.

Q. And in Figure 8 the section was taken through two of the liquid inlets?

A. That's correct.

Q. The relative positions of the pegs with respect to the liquid inlets are shown in Figures 10 and 11?

A. That's correct.

Q. In other words, they are rotated a slight amount? (694):

A. Right.

Q. Now I am going to hand you another chart which we will ask to be marked Defendant's Exhibit 44-10-B and will ask you to explain just what it illustrates, not repeating anything that you have said in connection with the patent and the earlier chart, if you can help it.

(The chart referred to was received in evidence as Defendant's Exhibit 44-10-B.)

A. Defendant's Exhibit 44-10-B is an exemplitive drawing of Solomon's Figures 7 and 8 and with certain sections taken on Figure 8 when the device is in operation and when the valve member is depressed, as it would be during the operation of the Solomon device.

Figure A is substantially that of Figure 7 of Solomon. Figure B is substantially Figure 8 of Solomon, with the further point that the valve member has been depressed as it would be when liquid is flowing through the Solomon device. Figure D is the uppermost section through Figure B and as shown there. Figure C is a lowermost section through a portion of the Solomon device, as shown on the chart too.

Incidentally, the point that the Court raised with respect to where the air inlets and the liquid inlets are with respect to each other is most clearly shown in Figure C, where you can see how the sections A and B are, taken at forty-five (695):

degrees with respect to each other.

Q. Isn't it a fact that the small openings in Figure C shown in solid lines are the liquid openings?

A. Yes, sir.

Q. And I note in between each of the liquid openings, or between two of them, there appears to be a circle in

dotted lines, with two lateral lines extending to the periphery of Figure C. What does that indicate?

A. Those are the air inlets.

Q. In other words, there is an air inlet between two of the liquid inlets?

A. Correct.

Q. And the air inlets are opened up to the outside, or atmosphere?

A. That's correct.

Q. And they extend in horizontally and then turn downwardly and are positioned so that air flowing therein travels in the same direction or in a parallel direction with the incoming liquid; correct?

A. Correct; as they enter the mixing chamber.

Q. Now I notice that you take one section of Figure D at the point shown in Figure B by the section line DD, with the arrows indicating that in the view you are looking downward?

(696):

A. That's correct.

Q. And you then have, do you not, a solid outside member?

A. Yes.

Q. And a plurality of openings that connect up together in that horizontal plan?

A. Correct.

Q. And you have sectioned the inner circle, which is the non-drip or closure member, which is positioned within that portion of the body; correct?

A. Correct.

Q. And I note that when you proceed further down and take a section through that same body at CC, as indicated in Figure C, you then have only a solid portion, pierced only by four inlet openings?

A. Correct.

Q. So that as the liquid enters within the upper portion of the Solomon device, as illustrated in Figure 2, we find liquid, if you could just cut the device at the section line DD, in a different condition and in a different formation than when the same liquid, passing downwardly, or downstream, passes through the four openings shown in Figure C?

A. Correct.

Q. Now, Mr. Lettvin, I am going to ask you to take a red pencil and, on the chart that you have, Defendant's (697):

Exhibit 44-10-B, indicate in Figure A an arrow line for the incoming air. Will you write the words "Air Inlet;" and will you do the same on the Court's copy?

(Witness marks and writes on Fig. A of Exhibit 44-10-B, as requested.)

Q. Now will you put an arrow on Figure B, indicating the liquid inlet?

A. Into the air chamber, or through the entire device?

Q. Well, just show where the liquid first comes in, and have a continuing arrow.

(Witness marks on Fig. B of Exhibit 44-10-B, as requested.)

Q. Will you mark opposite the arrows that you have just made in Figure B the word "Liquid"?

(Witness writes on Fig. B of Exhibit 44-10-B, as requested.)

Q. Will you do the same on the Court's copy?

(Witness marks copy as requested.)

Q. Will you now proceed to describe Figures 13 and 14, or that particular exemplification in the Solomon patent, explaining the difference rather than going through all the details?

A. Well, Figures 13 and 14 are a further improvement over Figures 7 tand 8, or, I should say, modification, and

(698):

it shows a different type of apertured diaphragm at the upper end of the device and a different type of spring-press valve member which operates as an anti-drip device. Furthermore, there is other structure, including a washer 26, which is operative to keep the entire assembly together as a unit—it is a valve member that was adapted to be slipped in so you wouldn't lose the spring; that's briefly what it is.

Q. I am going to hand you a chart which has been marked Defendant's Exhibit 44-10-C, illustrating Figures 13 and 14, and will ask you to explain that chart and the sectional views thereon.

(The chart referred to was received in evidence as Defendant's Exhibit 44-10-C.)

A. Defendant's Exhibit 44-10-C is again an exemplification drawing of Solomon's Figures 13 and 14 and on sections at C′C′ and D′D′, as indicated on Figure 14 of the exhibit. The structure is substantially as shown in Figure 13, that is, the upper left-hand figure, and in Figure 14 it is substantially as shown in Figure 14 of Solomon. Figure C′ and Figure D′ are arranged respectively below Figure 14.

Q. And I note that, instead of a flat member, referred to by reference numeral 13 in Figures 7 and 8 of the Solomon patent and as shown on Defendant's Exhibit 44-10-B, with an opening 14 therein, the arrangement of Figures 13 and 14 include a member having a conical opening in the

(699):

upper portion of the device.

A. That's correct. That's as shown in Figures 13 and 14 of the patent.

Q. Now, in so far as general makeup is concerned, is there any material difference as to whether you have the

form of opening as we find in the disc 13 in Figure 7 and the member 20 in Figure 13?

A. There is some difference, but, from a general standpoint there is none—when I say some difference, the conical inlet to the aperture 22 through the diaphragm in Figures 13 and 14 may reduce the losses that the liquid would sustain in passing through a sharply defined orifice as Figures 7 and 8, but that is a well-known expedient.

Q. Now I note, from a structural standpoint, that the member 13 in Figure 8 appears to be lapped in or spun in and held by the outside of the casing 1. Is that correct?

A. That is correct.

Q. Whereas, in Figure 13 the member is retained in position by being inserted within the body 1?

A. That's correct.

Q. That, again, is an expedient of manufacture?

A. Yes. It provides for easier disassembly in Figures 13 and 14.

Q. Now will you tell us the purpose of the illustrative (700):
portion of Exhibit 44-10-C, particularly the Figures D′ and C′?

A. Yes. When liquid is flowing through the device shown in Solomon's Figures 13 and 14 the valve member will be depressed to the position shown in Figures 13 and 14 in Defendant's Exhibit 44-10-C. When section lines, as shown at D′D′ and C′C′ are taken, as indicated, you find, as shown in Figure D′, an apertured diaphragm having a single annular aperture therethrough, and in Figure C′ you find an apertured diaphragm having four liquid passageways therethrough.

Q. So that if you take and cut the upper portion of the Solomon device shown in Figures 13 and 14 above the air inlets which come in from the side there below, you find

that the liquid at those particular places is of different formations?

A. Yes, sir.

Q. Now is it true that in Figure D' of Exhibit 44-10-C the liquid there is in an annular form?

A. Yes.

Q. And thereafter, as the liquid moves downstream, it assumes a jet or stream formation defined by the four openings shown in Figure C; correct?

A. Yes, sir.

Q. Now I am going to ask you quickly to take Defend- (701):
ant's Exhibit 44-10-C and indicate the air inlets and the liquid inlets, just as you did with 44-10-B.

(Witness marks and writes on Defendant's Exhibit 44-10-C, as requested.)

Q. And will you do the same on the Court's copy?

(Witness complies with request of counsel.)

Q. Now, while we are talking about Solomon, I am going to call your attention to the Aghnides British patent, which is in evidence as Defendant's Exhibit 14. You will recall that I asked Mr. Aghnides to read lines 27 to 41 thereof and I asked him if that referred to the Solomon structure, and he told me that I could accept it as that if I wanted to. I am now going to ask you, with your knowledge and ability to read patents, as to whether or not you can state what device is there referred to.

A. Solomon.

Q. What basis do you have for saying that Solomon is the device referred to there by Mr. Aghnides in his patent?

A. There are two bases; one, the description fits Solomon, to use a colloquial expression, like a glove, in that the description is of a tubular member—I am quoting—"a tubular member having a lower hollow part and a rela-

tively solid upper part in which were arranged liquid passages alternating with short passages communicating with
(702):
atmosphere at the sides of the device, whilst the lower hollow part supported a number of pegs below and transverse to the liquid passages." That is a very accurate description of the Solomon device.

Q. Do you have substantially the same words in the claim of the Solomon patent, which is in evidence as Defendant's Exhibit 44-10?

A. Yes.

Q. Will you read from the claim those words that describe the solid portion of Solomon and the hollow portion of Solomon?

A. Yes. Calling attention to claim 1 of the Solomon patent, which is Defendant's Exhibit 44-10, and beginning on the last line on page 4, in describing the claims—

The Court: Which column?

The Witness: The second column, the very last line in describing the claimed device, just in the middle it says: ". . . a lower hollow part and a relatively solid upper part."

Q. (By Mr. Freeman): Now those words are identical, without any change or transposition, as is found in lines 29 and 30 of the Aghnides patent?

A. Correct.

Q. Proceed.

A. Then, continuing: ". . . passage in said relatively
(703):
solid part serving as throughways for the liquid, passages alternating with said throughways, which extend only partly through said relatively solid upper part and communicate at their outer ends with the atmosphere, and pegs supported by the hollow part of the cylinder of the device in positions below and transverse to said throughways."

Q. While those words are not in identical form, we do find in the Aghnides British patent, Exhibit 14, the following: ". . . in which were arranged liquid passages alternating with short passages, communicating with atmosphere at the sides of the device, whilst the lower hollow part supported a number of pegs below and transverse to the liquid passages." Do you find substantially the equivalent in the claim of the Solomon patent, claim 1?

A. Yes, sir.

Q. And do you, from that, state as your opinion that the device there referred to was the Solomon patent?

A. Yes, sir.

Q. Is it also true that when the British application was filed by Mr. Aghnides no such paragraph was included in the application as originally filed—and I am handing you certified copy of the British application as filed, Defendant's Exhibit 41.

(704):

A. That is absolutely correct.

Q. You have made that check?

A. Yes, I have.

Q. Now will you tell the Court, from the certified copy that you have, whether or not the Solomon patent was cited by the British Patent Office against the Aghnides application after he filed his application?

A. Yes, sir. It appears on the last page of the certified copy from Great Britain, Defendant's Exhibit 41.

Q. And what is the patent number there referred to?

A. The last page contains a list of the references that were cited during the prosecution of the British Aghnides patent, and the reference referred to, the first one on the list, is 405,316, and that—

Q. I was going to ask you does that certified copy that you have give any name of the patentee of the cited reference?

A. No.

Q. It only gives the number?

A. Yes.

Q. And does that number, 405,316, correspond in number to the Solomon patent, Defendant's Exhibit 44-10?

A. Yes, sir.

Q. Can we call the upper portion of the Aghnides pat-
(705):
ent, or of Figure 1, that part including the apertured diaphragm 16 and the portion thereabove, an injector portion?

A. I take it you are referring to the first Aghnides patent.

Q. To the first Aghnides patent, particularly Figure 1.

A. Yes, you may refer to that as an injector portion.

Q. Do you recall Mr. Aghnides taking rather violent exception to my use of that term, injector portion—and I am now asking you what justification do you have for referring to that portion of the Aghnides patent, Figure 1, as an injector portion?

A. Mr. Aghnides' own patent in Britain, that is, a later issued patent than the one that's already in evidence, which is Defendant's Exhibit 14.

Q. Now the British patent that you referred to—I am sorry I do not have any extra photostatic copies; I just received this in the mail this morning—includes a figure corresponding exactly to Figure 1 of the first patent in suit, does it not?

A. Yes, sir.

Q. And that application was filed on what date?

A. June 22, 1938.

Q. And will you there refer to any portion of the specification which justifies your statement that the U. S.
(Tr. 706):

patent, Figure 1, that part above the air inlets but including the apertured diaphragm 16, may be referred to as an injector portion?

A. Well, here is one place—

Q. Will you give the line and then read it, because we only have one copy?

A. Page 1, column 1, lines 8 and following:

"In the specification of my Letters Patent No. 468,687 I have described a device for intimately mixing air with a liquid flowing under pressure, wherein an injector portion is provided, upstream of the part where it aspirates air, with a perforated cross partition that divides the stream of liquid into a number of small streams, and downstream of said part with an atomizing and mixing part comprising one or more finely perforated plates."

Mr. Ely: What is the number of that patent?

The Witness: That is 625,084, and it is dated June 22, 1949.

Q. (By Mr. Freeman): I notice the word "aspirates." Is that the exact word that is used there?

A. Yes, sir, "aspirates air."

Q. The word "aspirates" is used in the British patent for describing that which is shown in Figure 1 in the first U. S. Patent here involved; correct?

(Tr. 707):

A. In this sentence they are referring to the previous British patent, but what they say is exactly what takes place in Figure 1 of the U. S. patent 2,210,846.

Q. Incidentally, the British patent which you have in your hand, number 625,084, includes a figure corresponding to Figure 4 of the U. S. patent; correct?

A. Yes, it does.

Q. And does it likewise include a figure corresponding to Figure 6 of the first U. S. patent; or, if there are any differences, will you point them out?

A. Figure 5 of the British patent 625,084 is similar in all respects, all except one respect, with Figure 6 of the Aghnides U. S. patent 2,210,846. The only difference is that, while Figure 6 in the United States patent has but one screen at the lower end, Figure 5 in the British patent has two screens at the lower end.

Q. Now I am going to ask you with respect to the injector portion—and you read from the specification. Will you turn to the claim made by Aghnides in the British patent and tell me what is there stated in connection with the term "injector"?

A. May I read from page 3, beginning with line 11—and this is the only claim in the patent:

"A device for producing a jet of water containing air (Tr. 708):
bubbles, comprising an injector portion which is provided, upstream of the part where it aspirates air . . ."

And then it continues. That is not the end of the claim. I stopped in the middle.

Q. Will you read on just a little?

A. (Reading) ". . . with a perforated cross partition and downstream the said part with an atmosing and mixing part comprising one or more finely perforated plates . . ."

Do you want me to continue?

Q. No, that is sufficient, unless someone else wants you to read on.

So that the term "injector part" or "portion" doesn't necessarily define a vacuum pump, does it?

A. No, sir.

Q. Now in the Felten vacuum pump, as referred to by Mr. Aghnides and as illustrated on Plaintiff's chart—I believe the exhibit number is 46—would you just indicate to the Court that portion of the Felten illustration that may be referred to as an injector portion or part?

A. Yes; this orifice C, which terminates at approximately this point, just above or just where it meets the channel which brings in air, the portion above it.

Q. In other words, that portion above the part indicated in red on Plaintiff's Exhibit 46?

(Tr. 709):

A. That's correct.

Q. And the red indicates the inlet?

A. The air inlet.

Q. Now will you refer to the Aghnides fluid mixing device, which has been labeled "Aerator" in Plaintiff's Exhibit 46, and point out that portion of the device which may be referred to as an injector portion?

A. It is the portion immediately above the—it appears that the air inlets open directly into the top of the mixing chamber, so, therefore, it is the portion immediately above the air-inlet openings and the portion which defines the upper side of the mixing chamber.

Q. In other words, the diaphragm and the portion up above is an injector portion?

A. Yes, sir.

Q. And that is the way it is described in the British patent to Aghnides, which corresponds to Figure 1 of the U. S. first patent?

A. That's correct.

Q. Do you find any justification for selecting, as Mr. Aghnides did, that the injector portions or the parts are comparable, when he drew his dash line indicating that portion of Felten which he referred to as an injector; in

other words, you note there is a line that is normally intended, when making a comparison, to show that the parts (Tr. 710):

above the line in one may be comparable to the parts of another device—now do you know of any reason why Mr. Aghnides went way below the red portion, which is the air inlet, and went into the flared portion, or the portion closely adjacent the flared portion, for supporting his comparison.

A. I know of no reason.

Q. Would it have been proper, in view of what Mr. Aghnides stated to the British Patent Office, to have had the line cross-secting the Felten device just above the red air inlet?

A. It would have been more proper; it would have been correct. It would have been consistent to do it on both that way.

Mr. Freeman: I am going to offer in evidence as Defendant's Exhibit 45 the British patent to Aghnides, number 625,084. I am also going to ask permission of the Court if I can take it out this noon and perhaps I can get photostats made.

The Court: All right.

(The patent referred to was received in evidence as Defendant's Exhibit 45.)

Q. (By Mr. Freeman): Mr. Lettvin, I call your attention to the chart model, Defendant's Exhibit 37, together with the three inserts, Defendant's Exhibits 37-A, (Tr. 711):

37-B and 37-C, respectively, and I will ask you if the three inserts graphically disclose the difference in subject-matter as to claims 1, 2, and 3 of the second Aghnides patent.

A. They do.

Q. Now, Mr. Lettvin, will you turn to the second Aghnides patent and look first at the upper figure, which is Figure 1? I am going to ask you if I am correct in my description of that part which is identified by the reference numeral 17 as foraminous member.

A. Yes.

Q. Am I also correct if I refer to that same part, number 17, as a restricted orifice?

A. Yes.

Q. Am I correct in referring to the part, number 23, as an apertured diaphragm?

A. Yes.

Q. That part, number 23, is shown in Figure 2?

A. Correct.

Q. Could I also call it a formanious member?

A. Yes.

Q. May I also call it a screen?

A. Yes.

Q. Am I correct in calling part number 22 a restricted orifice?

(Tr. 712):

A. Yes.

Q. And, of course, 24 is likewise an apertured diaphragm?

A. Correct.

Q. Am I correct in referring to number 35, shown in Figure 3, which has only one opening in it, that is a relatively solid plate member with an opening in it about the same diameter as the thickness of the metal, as an apertured diaphragm?

A. Correct.

Q. Am I correct in referring to the opening 32 in Figure 3, a single opening, as a foraminous member?

A. Yes.

Q. Likewise am I correct in referring to that same identical opening as a restricted orifice?

A. Yes.

Q. In other words, I am correct in using the same physical makeup of a device having a single opening in it, calling it either an apertured diaphragm, a restricted orifice, or a foraminous member; correct?

A. Correct.

Q. Now, Mr. Lettvin, I am going to ask you what you find within the patent or the file wrapper of the second Aghnides patent for justifying either an opening in a plate being referred to as an apertured diaphragm, or a plural-
(Tr. 713):
ity of openings in a plate being referred to as an apertured diaphragm or a foraminous member, or, where a single opening is provided in the device, that it be referred to as a foraminous member.

A. You find that in the file wrapper, primarily, of the patent 2,316,832, and particularly in the brief to the Board of Appeals.

Mr. Freeman: Now I want to state on the record—I will be glad to have you follow me if you will check from the file wrapper of this patent—that Figure 1 of the patent in suit, at the time these claims here involved were before the Board, that figure was Figure 3; and that Figure 2 at that time was Figure 4; and that Figure 3 at that time was Figure 6.

I make that statement because it makes the reading of the portion we are going to read applicable, because, when they are talking about Figure 1, if you put Figure 3 on the outside of that, and Figure 2 was Figure 4, and Figure 3 was Figure 6.

I am also going to say that claim 15 referred to in the application is claim 1 of the patent; claim 16 became claim

2 of the patent; claim 17 became claim 3 of the patent; and claim 18 became claim 4 of the patent.

Perhaps I will read into the record, instead of letting (Tr. 714):

the witness do it, the portion that justifies the use of the words "restricted orifice," "foraminous member," and "apertured diaphragm" indiscriminately in connection with the three figures here involved. I now read from page 42 of the file wrapper, Plaintiff's Exhibit 17; and, so that I read it in its entirety, I am going to read the entire paragraph, although the first sentence is not necessarily applicable:

"The remaining claims are specific to certain elements of structure disclosed in various species. Claim 15 is limited to 'a foraminous member upstream the apertured diaphragm'. This reads on aperture 17, Fig. 3; screen 23, Fig. 4; aperture 32, Fig. 6."

So much for the quote in connection with claim 15, which became claim 1 of the patent in suit.

Q. (By Mr. Freeman): Now do you find in Defendant's model chart, Exhibit 37-A, the portion comparable to the quoted portion by Mr. Aghnides in his brief, to-wit, "a foraminous member upstream the apertured diaphragm"?

A. It is Defendant's Exhibit 37-B, and I do find it.

Q. So that, in so far as that structure, to-wit, a foraminous member, it can be a single opening such as 17?

A. Correct.

Q. Or it can be a single opening in a member like 35? (Tr. 715):

A. 32.

Q. 32. And it can be a screen such as 23?

A. Correct.

Q. Incidentally, is there any difference illustrated, in so far as you can visually note, between what is called a screen 23 in Figure 2 and that member 24 which is referred to as an apertured diaphragm?

A. It looks like it might be a little thinner vertically, but, other than that, I can't see any difference.

Q. Does 23 look like a plate that has a bunch of perforations therein?

A. Yes.

Q. And does 24 look like a plate that has perforations therein?

A. Yes.

Q. I am going to proceed to claim 16 of the application, which became claim 2 of the patent, and I am again going to read from the file wrapper:

"Claim 16 is limited to 'a restricted orifice upstream the apertured diaphragm'. Aperture 17, Fig 3; 22, Fig 4 and 32; Fig. 6, are restricted orifices upstream the apertured diaphragms 18, 24 and 35, Figs. 3, 4 and 6 respectively." Now I am going to ask to take that small portion of the defendant's exhibit illustrating the claim, particularly (Tr. 716):
claim 2 and tell me if there find the words "a restricted orifice upstream the apertured diaphragm."

A. The exhibit is Defendant's Exhibit 37-A, and I find all the words except the "a". The words are: "restricted orifice upstream the apertured diaphragm."

Q. And the "a", of course, is the immediate word preceding the insert that you find on Defendant's Exhibit 37; correct?

A. That's correct.

Q. Do you find therefrom that Figure 3, which is now Figure 1 of the patent, includes a restricted orifice, which is indicated by the number 17?

A. Correct.

Q. And do you find that 17 in Figure 2 of the patent, corresponding to Figure 4 of the application, includes a restricted orifice?

A. Yes.

Q. And so designated?

A. Correct.

Q. That is in Figure 4 of the application, Figure 2 of the patent?

A. Correct.

Q. And that 32 of Figure 6 is likewise referred to as a restricted orifice?

(Tr. 717):

A. Correct.

Q. So that, up to now, the opening 32 in Figure 3 can be called either a foraminous member or a restricted orifice; correct?

A. Correct.

The Court: Isn't that about three times we have got that same information in there?

Mr. Freeman: No, you haven't Your Honor. This is rather critical.

The Court: I think he's testified at least three times, if not four, that those words are used interchangeably and as to being synonymous, and that there is nothing in the patent that differentiates one from the other.

Mr. Freeman: That is what I want to get across, Your Honor.

The Court: It's been across to me since he first said it.

Mr. Freeman: I haven't gotten to claims 3 and 4.

Q. (By Mr. Freeman): Now claim 17 became claim 3, and it states that "Claim 17 is limited to 'a restricted

orifice and foraminous member upstream the apertured diaphragm'. This is shown for example in Fig. 4, 22 being the restricted orifice, and 23 the foraminous members."

A. Correct.

(Tr. 718):

Mr. Freeman: And the amendment, or the argument, continues: "None of those forms are found in applicant's prior patent."

At this time I am going to offer in evidence a graphic illustration of what I was trying to get from the witness, in the form of a copy of the Aghnides second patent drawings, with the various words, such as "foramiminous member," "apertured diaphragm," and so forth, referred to, and lead lines indicating the particular numbers to which they are applicable, this exhibit being numbered Defendant's Exhibit No. 46.

(The copy of drawings referred to was received in evidence as Defendant's Exhibit 46.)

Q. (By Mr. Freeman: Is it not true that in the second Aghnides patent, on lines 1 and 2 of column 2, reference is made to two spaced apertured diaphragms 23 and 24?

A. Correct.

Q. And that in line 24 reference is made to a foraminous diaphragm as 23?

A. Correct.

Q. So that the parts are referred to interchangeably in the patent specification; correct?

A. Correct.

(Brief recess taken)

(Tr. 719):

Mr. Freeman: I want to read into the record, from Plaintiff's Exhibit 17, file wrapper of the second patent in suit, a reference to claim 18 during the pending application, which became claim 4 of the present second patent.

Mr. Ely: What page?

Mr. Freeman: Page 34.

(Reading) "Claim 8, lines 4 to 6, groups the apertures 17 and 18 as 'apertured diaphragms' which do not materially differentiate from the diaphragm with orifice in the patent claim."

Now that statement is by the Examiner in the Patent Office, wherein he refers to the term "apertured diaphragms," which we find in claim 4 as the apertures 17 and 18, which we find now in Figure 1 of the patent in suit, which was, of course, number 4 while the application was pending.

The Witness: Number 3.

The Court: I thought you said Figure 1 was 3 in the application.

Mr. Freeman: I misstated myself. Three, then.

Q. (By Mr. Freeman): Now, Mr. Lettvin, I hand you a paper which I have asked to be marked for identification at this time as Defendant's Exhibit 47—

The Court: Are you going to offer it?

Mr. Freeman: Yes.

(Tr. 720):

The Court: Then why not put it in as your exhibit?

Mr. Freeman: It's perfectly all right to offer it, even though I am going to make some reference numerals on it later on?

The Court: Yes; go ahead.

Mr. Freeman: I want to state for the record that the paper which I have is a photostatic copy of the Chicago Faucet Company Change Order, and I am only using that portion of the paper which illustrates a figures above the word "Present," to which I have added in my handwriting, in red, the numbers "18-24-35," and the letters "A" and "B".

(The chart referred to was received in evidence as Defendant' sExhibit 47.)

Q. (By Mr. Freeman): Now, Mr. Lettvin, in the patent in suit, all of that shown in Figure 3—I am talking about the second patent—including the apertured diaphragm 35 a. l that part there below corresponds to what we call the first Aghnides patent; correct?

A. Correct.

Q. And is it likewise true in Figure 2 that the apertured diaphragm 24 and all of the parts there below correspond to the first patent in suit?

Mr. Ely: May I interrupt, Mr. Freeman? If what you are attempting to do at the present time is to say that the (Tr. 721):

device in that drawing that you just produced is an embodiment of the second patent, you needn't spend any more time on it. We say that it is.

Mr. Freeman: I am trying to find out wherein the second patent differentiates from the first, and if you will agree with me that in Figure 3—and I will use only that figure for the time being—the part above 35, on above restricted orifice 32 and the portion thereabove, brings about the second patent—

Mr. Ely: I have said that myself many times in this hearing. There is no use going into it. As I see, you are just taking up time.

Q. (By Mr. Freeman): Now, Mr. Lettvin, in connection with Exhibit 47, do you have there an apertured diaphragm corresponding to apertured diaphragms 18, 24, and 35?

A. Yes, I do.

Q. And are they so marked in red?

A. Yes.

Q. And I think we have agreed with counsel for the

plaintiff that from that aperture down illustrates what we have referred to as the first patent?

A. Correct.

Q. Do you find in Exhibit 47 any part or portions or elements above the apertured diaphragms 24, 35, or 18? (Tr. 722):

A. I do.

Q. And what do you find?

A. I find two members. The first member is in the form of an adaptor, having a restricted passageway therethrough.

Q. What is the reference numeral applied to that portion of the device?

A. The reference letter is "A". And the second member I find upsteam of the apertured diaphragms 18, 24, or 35 is a screen, which has been marked with the numeral, or the letter, "B".

Q. Now I am going to take that portion of claim 1 which we have on the chart, Defendant's Exhibit 37-B, an ask you if you find a foraminous member upstream the apertured diaphragm in Defendant's Exhibit 47.

A. I do.

Q. And will you point that member out?

A. Well, it could be either member A or member B.

Mr. Ely: Your Honor, I have already conceded that. He is encroaching on our time.

Mr. Freeman: Will you concede that the device which we have there, which is the Chicago Faucet device, reads on all four claims of the second patent in suit?

Mr. Ely: No, I can't say that.

Mr. Freeman: Well, that is what I am doing. (Tr. 723):

The Court: Well, go on with it.

Q. (By Mr. Freeman): Do you find that foraminous member?

A. I do.

Q. And is that in the form of a restricted orifice?

A. Yes, sir.

Q. And that member can be referred to either as a foraminous member or a restricted orifice?

A. Yes, sir.

Q. Take claim 2, and I will ask you if you find above the apertured diaphragm referred to by the numbers 18-24-35 a restricted orifice upstream of this apertured diaphragm.

A. Yes, I do.

Q. And what part is that?

A. Either of the members A or B.

Q. Now I find in claim 3 the words "restricted orifice and a foraminous member upstream the apertured diaphragm," and I am going to ask you to tell me which parts of the Chicago Faucet Company illustration, Defendant's Exhibit 47, correspond to those parts.

A. Both A and B, taken together, constitute the restricted orifice and a foraminous member upstream the apertured diaphragm 18-24-35.

Q. Now in claim 4 reference is made to superimposed—and I think I am quoting that—
(Tr. 724):

The Court: "Superposed apertured diaphragms."

Q. Now do you find in Exhibit 47 superposed apertured diaphragms?

A. Yes, I do.

Q. And what are those parts?

A. Take apertured diaphragm 18-24-35 with either of the other two members heretofore mentioned, A or B, and you have superposed apertured diaphragms at the upstream end of the chamber.

Q. Now the Examiner referred to the two apertured diaphragms as 17 and 18 in Figures 1?

A. Correct.

Q. That is, Figure 1 of the patent?

A. Correct.

Q. Do you find, then, in Defendant's Exhibit 47, parts corresponding to the apertured diaphragm 18 and that part which is referred to as 17 in Figure 1 of the patent in suit?

A. I do. The adaptor compares more closely to the way it is shown in 17 in Figure 1, that is, the adaptor A of Defendant's Exhibit 47.

Q. Then is it your position that each of the four claims of the second patent read upon the disclosure of Defendant's Exhibit 47, that single figure above the word "Present"?

A. Yes, sir.

(Tr. 725):

Mr. Freeman: That's all. You may cross-examine.

CROSS EXAMINATION

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(Tr. 781):

Q. Now, Mr. Lettvin, would you tell me which one of these references you think comes closest to Aghnides?

The Court: Didn't he cover that in the cross examination by Mr. Ely?

Mr. Adams: Well, I don't recall. I think we have covered the differences which exist between any one of them and Aghnides.

Q. (By Mr. Adams): You don't contend that any one of them is exactly the same as Aghnides, do you?

A. It depends which Aghnides are you speaking about. Are you speaking about the first patent?

Q. Well, let's take the first patent. There isn't any one that's just the same as that, is there?

A. Your question is what, now?

The Court: Which one of these references most nearly covers the Ag. ides patent?

Mr. Adams: Take them one at a time. Take the first patent.

The Court: Will that mean a rehashing of what you have just gone over?

(Tr. 782):

Mr. Adams: I hope not, Your Honor.

The Witness: There are a number of forms shown in the Aghnides first patent. Some of the forms use screens exclusively for mixing up and dividing the water. Other forms use impingement shoulders, or projections inwardly from the wall of the casing upon which jets impinge, for breaking up the water. Now I think we should make a distinction there. With respect to the screens which are used for breaking up and mixing the water and air, I consider Hyatt, Figure 5, and the British Felten patent 6,012 of 1909 to be the closest references. With respect to the use of projections inward from the wall upon which the jets impinge in order to bring about mixing water and air, I consider Solomon British patent 405,316, the Battersby British patent 323,242, and I might say the Aghnides device which uses the onion-shaped member—I think that is 1,912,113, to show impingement members or solid members upon which the water hits for breaking up and mixing water and air, to be the closest references.

Q. You take elements here and there, but you don't find any prior reference which shows the structure or the combination which Mr. Aghnides created, where you have a water aerator to be attached to a faucet which has in it means of producing one or more jets, and then apertures

(Tr. 783):

into which air may come, and then means interposed in the path of those jets for finely breaking up the stream and converting it into an intimately mixed, bubbly stream and making it coherent?

A. I do find.

Q. You do find that?

A. I said with respect to when he used screens alone I consider Hyatt and Felten to be the best references; when he uses the break-up member, or inward projections upon which the jets impinge, then I consider Solomon, Battersby and the Aghnides vacuum pump patent 1,912,113 to be the best references.

Q. You think they accomplish just what Mr. Aghnides does?

A. They mix water and air and it issues from the outlet end of those devices.

Q. Aren't you really taking the position that the differences are such that you don't think they would be anything other than obvious to the man in the art; isn't that what you are saying?

A. Whatever differences there are I would consider. I don't even find that many differences.

Q. Well, we have been over a good many of those differences. With respect to which one do you find that (Tr. 784):

there is a stream produced like the stream that Aghnides produces?

A. We saw Felten in operation. That produced a coherent aerated stream.

Q. That was really the only one, wasn't it?

A. That was the only one we saw you produce.

Q. I am asking you about your position, Mr. Lettvin, not what we have demonstrated. Which one of these devices

do you contend produces the character of stream that Mr. Aghnides produced in his device?

A. Oh, I think that Hyatt will produce that, because I might point this out to the Court: that with respect to the second patent, 2,316,832, in Figure 3, below the adaptor 31, there is shown a structure which includes a casing and a single upstream diaphragm having the single orifice 36 there through and five screens spaced below the airports 34. Now that structure, Mr. Aghnides testified, would produce a coherent aerated stream. And then I call the Court's attention to Figure 5 of Hyatt, which shows the identical structure—

The Court: What is the number of Hyatt?

The Witness: Hyatt is number 1 in the books of patents, Figure 5, on page 3 of the drawings. Now there (Tr. 785):

you have a device which includes a casing, and then you have water coming in through a restricted plate, that is, restricted with respect to the diameter of the casing, and then you have an air-inlet port W in the side of the casing, and then you have five screens below that air inlet for the mixing of the water and air to produce aeration and, as I pointed out in my direct testimony, the specification states that the screens L alone may be used in an aerating device of this type.

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REDIRECT EXAMINATION.

By Mr. Freeman:

Q. Mr. Lettvin, I want to ask you a question or two with respect to the Battersby patent. Mr. Adams called your attention to the fact that it was connected to a soda fountain device, and then called attention to the dispensing of the soda water in a violent stream. Mr. Adams

likewise asked you if there were any bubbles in the water, and I think your answer, as I gathered it, intimated that (Tr. 786):

there might be or there might not be. I am going to ask you to turn to page 3 of the patent, at line 117, and tell me what the patentee says, prior to the time when Mr. Aghnides began working on the subject-matter here involved, with respect to plain drinking water and air bubbles. Will you read that portion?

A. Yes. It says: "When plain drinking water is aerated the visible air bubbles soon disappear, although if the aerated water is examined under a powerful lens the air is seen in suspension for some time afterwards."

Q. I am going to ask you now, from that statement, do you understand that the air and water are mixed?

A. Yes, sir.

Q. Do you likewise understand from that phrase that the air within the water assumes bubbles within the water?

A. Yes, I do.

Q. And is it a fact that when air and water, the air being in bubbles mixed with the water, is discharged from a spout or spigot that it will come out in a whitish or greyish form?

A. That's true.

Q. Is that because of entrapment or entrainment of air bubbles within the water?

A. Yes.

(Tr. 787):

Q. Now, if you were putting the Battersby device on a drinking tap for tap water or plain drinking water and you found too much splashing, or water coming out in a stream that was violent, and you wanted to iron out, using your words, any turbulence, what would you do?

A. Put an anti-splash device at the end.

Q. Might you put one on of the kind on tap water, where you don't necessarily want to mix up soda and water, as is true in a soda fountain?

A. Yes.

Q. Could you then take what was known in the art long prior to any of the activities of Mr. Aghnides and put it on the lower end of the device which has been marked "n" in the drawings, Figure 2?

A. Yes.

Q. If you put a Purser device, which is patent number 7 in the binder, on the lower end—Purser said that his device relates to splash-preventers for domestic and other types, and, following the Battersby patent, where he says when plain drinking water is used, could you use a Purser device on the lower end of Battersby?

A. All it has to do is be attached at the lower end, like Purser says, to eliminate—it's a splash-preventer for domestic and other taps, and you could put it at the

(Tr. 788):

end of any device through which liquid is flowing, particularly in a kitchen.

Q. Might we assume that the device shown in the Battersby drawing as an anti-splash device, which is referred to by the reference numeral "t," is used in connection with water being dispensed at a soda fountain?

A. I don't follow you.

Mr. Freeman: Would you read that question?

(Pending question read by the reporter.)

The Witness: Yes.

Q. (By Mr. Freeman): And if you wanted to have plain water, as taught by Battersby, would you not then put on an anti-splash device of the well-known kind used in connection with tap water faucets?

A. That is true; I would.

Q. In addition to the Purser patent, which has to do with an anti-splash device, I am calling your attention to a patent to Vielliard, and will ask you to quickly—

The Court: Is that in evidence?

Mr. Freeman: It is not in evidence yet.

The Court: Is it one of the patents pleaded?

Mr. Freeman: It is a patent that is pleaded, Your Honor.

The Court: Why is it that you didn't put it in evi-
(Tr. 789):
dence?

Mr. Freeman: Because I didn't think we were going to get into a difference—I wanted to cut down the record as much as possible.

The Court: Go ahead, then.

Q. (By Mr. Freeman): Will you describe Figure 1 quickly?

The Court: Do you want to offer that as an exhibit?

Mr. Freeman: Yes. It will be 44-12.

(The patent referred to was received in evidence as Defendant's Exhibit 44-12.)

A. This Vielliard patent is an anti-splash device, and it's supposed to be mounted at the outlet end of a faucet, and it consists of a casing having what appears to be a constricted inlet end at the upper end that does not have a reference numeral, and it has, I believe the specification states, one or more dividing plates or screens. Could I just check the specification in that regard? It says "one or more metal sheets or plates dd which are forced into the device." I am reading from the specification, page 2, lines 32 to 34. And then, below those metal sheets or plates, there is a constricted outlet bi; and, if I might just mention, the first paragraph refers to the invention as—may I read: "This invention relates to a small ap-

(Tr. 790):

pliance which I term a 'jet-breaker' and which may be adapted to cocks or nozzles for the flow of water or other liquids, for the purpose of regulating the flow and more particularly for preventing the liquid from splashing."

Q. Do you understand from the disclosure there that you have a restricted outlet, or contracted outlet, and directly above the contracted outlet you have one or more either screens or plates—I'm not sure which the patent states—for bringing about a stream that is of the non-splash type?

A. Correct.

Q. Now, Mr. Lettvin, it was brought out that the Felten patent, with its widening-effect mixing chamber, is of the Venturi Principle?

A. Correct.

Q. Is it correct to state that the Aghnides device is of the Venturi Principle—and I am referring now to the first patent of Aghnides?

A. That's correct.

Q. And where do you find any reference to the Aghnides device employing a Venturi Tube Principle?

A. Well, both in the specification and in the file wrapper. In the printed patent, on page 1, column 1, lines 13 to 16, he states: "Proper openings are provided leading into the chamber from the outside air so that the flow of

(Tr. 791):

water will draw air into the chamber according to the well-known Venturi principle."

Q. And do you likewise find reference to the Aghnides device being of the Venturi principle in the file wrapper, Plaintiff's Exhibit 16—and I call your attention to pages 54 and 55 and ask you to read, making it as short as possible?

A. There are a number of occurrences where this appears in the file wrapper.

Q. I am going to limit you to those two pages, because the file wrapper is in evidence and we can refer to it, if we wish, in our argument.

The Court: I was just wondering what advantage it is to have it read by him. You can mention it in your brief.

A. (Reading): "Applicant's device is in combination with the Venturi Tube principle." At page 55 it says, beginning in the middle of a sentence. " . . . applicant's device embodies structural requirements of the Venturi Tube principle . . . "—and that ends in the middle of a sentence, too."

Mr. Freeman: That's all.

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(Tr. 792):

ELIE P. AGHNIDES, called as an adverse witness by the defendant, having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Freeman:

Q. Mr. Aghnides, can we agree that Figure 6 of your first patent—and pay no attention to my notes on it—is the form closest to the device charged to infringe?

A. Yes.

Q. And that form includes projections extending inwardly from the wall of the casing?

A. Yes.

Q. And I take it that the term "projections" can mean either a continuous inturned shoulder or a plurality of devices or shoulders extending from the wall?

A. Well, it's what is shown in the drawing.

Q. Well, in the drawing is shown a continuous shoulder; correct?

A. Yes.

Q. And the term used for describing that continuous (Tr. 793):
shoulder is the word "projections;" correct?

A. Yes.

Q. Might the device which has the inturned portion of Figure 6 be made of a plurality of shoulders or projections; in other words, not continuous, is what I am seeking?

A. Figure 6 shows two shoulder's; in other words, it corresponds to two projections.

Q. Well, the sectional view shows the two shoulders. Actually, those shoulders extend inwardly all around the annulus of the inner wall of the casing; is that not correct?

A. I am afraid I don't understand your question. We see the inner wall—

The Court: Does the shoulder go all the way around?

The Witness: The shoulder goes all the way around, yes.

Q. (By Mr. Freeman): So that it is a continuous shoulder?

A. Continuous, yes.

Q. Now the term used in the patent specification is "projections"?

A. If it says "projections," that must be the term used. I don't remember by heart.
(Tr. 794):

Q. That is on page 2, column 1, line 73.

A. Yes, "extending projections."

Q. And I now ask you if that might not be a plurality, or one or more, of spaced inwardly extending projections or shoulders.

A. Could be.

Q. Can we agree that the disclosure corresponding to Figure 6, where you have inwardly projecting projections from a shoulder—and I'm not raising any question about terminology—that Figure 6 is shown for the first time in your United States application filed on December 31, 1937?

A. Figure 6 as is shown there, correct, in that form.

Q. And it was not shown in the original application that you filed in the United States on December 4, 1935?

A. The figure as is there was not shown, but my Belgian application, on which the American application was based, stated that baffles are in the path of the water, or screens; so these are baffles.

Q. Will you agree with me that the Belgian patent did not show any counterpart or any figure corresponding to Figure 6?

A. Not exactly to Figure 6, no, but it explained that it could strike plain surfaces, which is baffles.

(Tr. 795):

Q. Can we also agree that the British patent number 468,687, Defendant's Exhibit 14, does not show any figure corresponding to Figure 6?

A. No, it does not show; those drawings do not show a figure corresponding to Figure 6 of my U. S. patent.

Q. And is it not true that the Belgian patent does not show any figure corresponding to Figure 6?

A. No, but the specification states, though, it could be baffles, and shows the preferred form of resistance, which is screens.

Q. And the term "baffles," as used in the Belgian patent, was directed to a pair of screen members at the lower end of Figure 1, referred to by the reference numeral 9; correct?

A. No, I think the specification says baffles—

Q. Or sieves?

A. Or sieves.

Q. Baffles and sieves are the same?

A. No.

Q. They are different?

A. They could be different, yes.

Q. Are baffles and sieves and projections the same?

A. They might be equivalent.

Q. They might be the equivalent?

(Tr. 796):

A. They might be the equivalent.

Q. But we can agree that there are no drawings in your British patent, as well as your Belgian patent, showing inwardly extending projections or shoulders as we find in Figure 6 of your U. S. patent?

Mr. Adams: Which British patent?

Mr. Freeman: The British patent that has to do with the structure here involved. It is number—

Mr. Adams: 468,687?

Mr. Freeman: That's right.

A. I would, however, say that in Figure 5 of this British patent here, which is, I believe, the same as the corresponding figure of the Belgian application, we see that the orifice through which the water comes out the perforated plate 5 is above the shoulder, so the water might very well strike before getting to the screens and be party broken up.

Q. Now do you find in Figure 5 a structure corresponding to projections that extend inwardly from the walls of the mixing chamber, or the tube which forms the mixing chamber?

A. Yes, I find there walls projecting inwardly, above which are some orifices in the perforated disc 5.

Q. Will you state now that you rely on Figure 5 of (Tr. 797):
either your British patent or your Belgian patent as a basis for the disclosure of Figure 6 in our patent number 2,2_0,846, filed December 31, 1937?

Mr. Adams: May I ask what you mean by "rely"? Do you mean as a matter of law, or the immediate disclosure; which are you talking about?

Mr. Freeman: The immediate disclosure. I'm not trying to get into any law questions with Mr. Aghnides.

A. Well, that Figure 6 is in accordance with the disclosure made in my Belgian patent, which is speaking of baffles and which also shows in Figure 5 a stream which could strike first an inclined surface before reaching the screens. It is not an exact duplicate, but according to the same principles.

Q. In other words, for the purpose of establishing Figure 6, which has an inwardly extending shoulder or projections, Figure 5 is the closest, or at least approximates in structure and function, that which is called for in Figure 6?

A. It is the same idea, yes.

Q. And do you find in the Belgian or British patent any directing means for directing the jets and water outwardly or at an angle against the wall of the casing and against the shoulders?
(Tr. 798):

A. I do not find that, but I have the walls below the orifice.

The Court: Didn't you go over all of that on your cross-examination previously?

Mr. Freeman: Not this, no, sir. Your Honor, I am just laying a foundation. I don't want to explain it, but I am trying—

The Court: I'm not asking for an explanation, but doesn't that page there (indicating page of record) cover the very identical thing you are going over now?

Mr. Freeman: In a measure, yes, Your Honor.

The Court: Avoid doing that as far as possible.

Mr. Freeman: I will do that, Your Honor.

The Court: Go ahead, then, with your examination.

Mr. Freeman: I think I can shorten it.

The Court: I don't want to cut you off, but I just don't want any duplication of the record.

Q. (By Mr. Freeman): In Figure 6, in the particular form which you say is closest to the defendant, that specific form we first find in your United States patent in suit, your first patent?

The Court: He's already said that.

Q. And that application was filed more than twelve months after the filing of your British patent; correct? (Tr. 799):

A. I didn't figure it, but the dates are there.

Q. December 8, 1934; December 31, 1937?

A. Yes.

Q. That is more than twelve months?

A. Yes. The difference—

Q. And will you agree with me that your British patent issued prior to the filing date of your United States patent 2,210,846?

A. Yes, sir. While we find in Figure 6 the streams directed laterally to strike the extending shoulders, in Figure 5 we find those shoulders brought below the stream, which is equivalent, and the specification says that the streamlets may strike baffles or screens or sieves.

Q. Just one additional question. Turing to the British patent, do you find there disclosed the idea of the use in an aerator of projections that extend inwardly from the wall of the casing?

A. Are you referring to this paragraph between lines 27 and 40?

Q. That is one paragraph. I don't want to limit you, nor do I want to direct you to any particular portion of the patent.

A. Because you showed me—

Q. Well, in order to save time; but you are not limited (Tr. 800):

to that. Use anything you want out of the patent.

A. It says "It is proposed to provide a liquid aerating device comprising a tubular member having a lower hollow part and a relatively solid upper part in which are arranged liquid passages alternating with short passages communicating with atmosphere at the sides of the device, whilst the lowest hollow part supported a number of pegs below and transverse to the liquid passages."

Q. Are you through, Mr. Aghnides?

A. Yes. Well, this reference probably is relating to the Solomon device.

Q. But, in so far as your patent is concerned, the British patent discloses in an aerating device projections in the form of pegs that come inwardly—

A. Those pegs come inwardly.

Q. (Continuing)—from the wall of the housing, against which liquid passes and impinges; is that correct?

A. Well, we know the structure of the Solomon patent, only the Solomon patent may be for aerating water, but it is not for producing a bubbly stream.

Q. No, I am just asking you if there is a disclosure in your British patent number 468,687 that has to do with projections against which the water impinges in its flow (Tr. 801):

from the time that it enters the device until its exit from the device?

A. Before its exit it strikes—there are pegs in the path of the water, jets of water, and the jets of water strike those pegs, yes.

Q. And that is within a mixing chamber?

A. Within a chamber, in the way Solomon intends to mix.

Q. I am not asking about Solomon. I am asking you if your patent discloses the idea of projections going inwardly from the wall against which the water strikes and impinges.

A. Yes, a device that has a different mode of operation, and they operate differently.

Mr. Freeman: That's all, Your Honor.

(Tr. 803):

ELIE P. AGHNIDES being recalled, testified further as follows:

DIRECT EXAMINATION

(Tr. 804):

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Q. (By Mr. Adams): It is a fact, is it not, Mr. Aghnides, that the Chicago Faucet Company has been a licensee of yours under the first patent in suit and the second patent in suit for some years?

A. Yes.

Q. Do you remember when that license was entered into?

A. Yes; December 2, 1937.

Mr. Adams: I may mention that this device Mr. Freeman took the depositions about was created, but not marketed, sometime in 1938.

Q. Now will you develop for me the circumstances of entering into that license? When did you first come to this country?

A. In 1937, in June; and tried for many months to find a suitable manufacturer to make aerators under my patents and, after approaching several firms, I approached the Chicago Faucet Company and, after a few days talking and demonstrating and explaining, we had an agree-
(Tr. 805):
ment signed on December 2, 1937.

Q. Prior to that time had your devices been manufactured abroad?

A. Rubber-made ones.

Q. Did you bring a sample of that with you?

A. I did.

Mr. Adams: I have here a device which I would like to have marked for identification, which is our Exhibit No. 65. I show it to you, Mr. Aghnides, and ask you whether you can tell me what it is.

A. This is a water aerator made by my French licensees. The French license was granted in 1936, and then I came to this country in 1937 and I brought this with me, and this device contains, this aerator made by my French licensee in 1937, or earlier, contains a restricted orifice, which is obtained by means of a metal tube inserted a little above the diaphragm, which gives the jets of high velocity.

The Court: Are you going to offer that?

Mr. Adams: Yes, sir, I will offer it.

(The aerator referred to was received in evidence as Plaintiff's Exhibit 65.)

Q. (By Mr. Adams): Does that aerator embody the means of both your first patent and your second patent?

(Tr. 806):

A. It did.

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(Tr. 807):

Q. I show you a letter document, dated October 17, 1936, and ask you to identify it.

A. May I complete the name I was giving to Mr. Jewett (the reporter)? "Establissments Pierre P. Zecchini, Paris."

Now this is the agreement entered into with said company October 17, 1936, and this company made the aerator I produced at the time.

The Court: Plaintiff's Exhibit 65?

The Witness: Yes, sir.

Mr. Adams: I offer this agreement as Plaintiff's Exhibit 66.

The Court: Do you have an English translation there?

Mr. Adams: I think we have the English translation, which we might attach to it and mark 66-A, if Mr. Aghnides will vouch for the translation, subject to correction.

(Tr. 808):

The Court: I think we can take it and check it. I will admit it.

(The letter and translation referred to were received in evidence as Plaintiff's Exhibits 66 and 66-A, respectively.)

Mr. Freeman: I am going to object to it, Your Honor, unless we have in here the subject-matter of the license, and I would like to see the French patents that are here involved. I have no way of knowing—it may be a license for something entirely different.

Q. (By Mr. Adams): What was the subject matter of the patent, Mr. Aghnides?

The Court: It says it is limited "to your French patent applications Nos. 790,556 and 800,069 and to the device represented and described in your patent No. 800,069 Fig. 1."

What about your French patent; is it in evidence here or not?

Mr. Adams: No, Your Honor, we do not have a copy of this application that's referred to.

Q. (By Mr. Adams): It is the equivalent of the Belgian patent and the English patent?

Mr. Freeman: That is objected to as calling for a conclusion, and a legal one at that.

The Witness: And this aerator is made in accordance (Tr. 809):
with that license, which has all the elements of my two patents.

The Court: What have you got to say to his objection? He is objecting because you don't have the patent.

Mr. Adams: All I can say is that we don't have it here, but it does establish this company was licensed by him under something to make this particular device—

Mr. Freeman: If Your Honor please, I can help you, Mr. Adams. If you will agree with me that the French patents referred to in the agreement here, this French agreement, included a restricted orifice at the upper end—

The Witness: No.

Mr. Freeman: Well, that is what you are talking about. You are carrying your date of invention back with respect to the second patent, which has to do with a restricted orifice before the water gets from the faucet into the so-called aerator proper. I will agree with you that the French patents included that particular feature.

Mr. Adams: I just don't know, and it's not important to my presentation whether it's true or not—

Mr. Freeman: Well, it's important to me.

Mr. Adams: All I want to show, Your Honor, is that this company was licensed by him to make his inventions. (Tr. 810):

The Court: You can secure, if necessary, the patent itself, can't you. I will allow you to offer it, and you can supply the original patent, a copy of it. I will give the defendant an exception.

Q. (By Mr. Adams): Did you disclose to this French company a structure to be made by them under license?

A. I did.

Mr. Freeman: Again, Your Honor, I want to shorten this. I want to object to it, that something he disclosed to somebody in France hasn't a thing to do with what we are trying here, taking the date of invention back. The statute says that whatever activity is had in a foreign country is of no avail.

The Court: Let him present his facts, whatever the legal significance is. I am going to let it in and give the defendant an exception.

• • •

(Tr. 838):

CROSS EXAMINATION

• • •

(Tr. 843):

Mr. Freeman: Mr. Aghnides, I am now going to ask you again the question that I last asked: What would happen if you used the anti-splash device of the British patent, Exhibit 44-12, dated in 1899, wherein there is provided one or more screens and a contracted end, and you took off the umbrella-like member t from Battersby and screwed on the device shown in Figure 1, the members á and f?

The Witness: Well, Figure 1—this patent was brought to my attention today—described, I think, many perforated discs—

The Court: You call this a British patent. This is a French patent, isn't it?

Mr. Adams: It's a French inventor and British patent.

The Witness: Well, this shows certain types of non-splash devices. Now we have in the market non-splash devices. It is a fact, a well-known thing, a non-splash device to be added when the ordinary water is splashing, and those non-splash devices have different degrees of resistance, so they are not adapted to be attached to a (Tr. 844):

water aerator which has a certain mode of operation and where, if you added too many of those screens as an anti-splash, the water will squirt out of the lateral holes, as we have seen during the test in this court, and if you put too few the water would still splash, and if you happened to put just the required amount, then you would be superposing two existing inventions to create the Aghnides invention.

* * *

Mr. Freeman: You haven't answered my question. Taking off the umbrella-shaped member t, which is the anti-splash device which spreads out of the Battersby, and substituting therefor a device of the kind shown in the British (Tr. 845):

patent to the Frenchman, I am now asking you whether or not the two screens, one or more screens, together with a contracted end, would not in fact produce a coherent stream of water?

The Witness: It could, and would, depending on the resistance offered by the anti-splash device, but, if it did,

it would change the mode of operation of that device and that device would no more be Battersby if it did. If you just selected a non-splash device which happened, by accident, to fit this Battersby and make it a bubbly stream, then you destroy the mode of operation of this patent and of this device.

Mr. Freeman: Now isn't it a fact that the mode of operation of the device, the Battersby device, is the same whether or not you have an anti-splash device on the bottom, in so far as the Battersby patent is concerned?

The Witness: Are you talking of the anti-splash device Battersby devised for his patent?

Mr. Freeman: I said if you removed the Battersby anti-splash device t, would there be anything different than a jet of water coming through the opening m, sucking in air through the openings j, the water moving downward, striking the contracted neck or shoulders or the inturned portion n, and then striking the pin or plug or peg u, and (Tr. 846):

then going out to atmosphere.

The Witness: Well, I think it would be quite a splashing and dispersion, as it is if you remove this (indicating).

Mr. Freeman: And when you say "remove this," you are now removing t, that is, the letter "t", you said would bring about a device that would suck in some air, a single jet would go down and strike a peg or projection and then go out in an incoherent stream; correct?

The Witness: That's right.

Mr. Freeman: Now I am asking you what would happen if you took the British patent of 1869, Defendant's Exhibit 44-12, and put that on the bottom of the Battersby device. Would you not then have the water passing through the one or more screens and being contracted so as to come out in a well-defined column?

The Witness: Not necessarily. It depends on the resistance offered by that device.

Mr. Freeman: Is that the only difference, then, that it would depend on resistance?

The Witness: You have to proportion in order to obtain what you want; in other words, to transform the dispersed Battersby stream into a coherent Aghnides stream.

• • •

(Tr. 847):

Mr. Freeman: Now what do you understand from the patent that you are holding in your hand, Defendant's Exhibit 44-12, is meant by the terminology, one or more screens or plates?

The Witness: I understand that these devices called anti-splash, being created for the ordinary water faucet, it would not matter whether you put one or ten or twenty screens.

Mr. Freeman: It wouldn't make any difference?

The Witness: On the ordinary water.

Mr. Freeman: With aerated water?

The Witness: Well, with aerated water it would make a great deal of difference.

(Tr. 848):

Mr. Freeman: I am talking about the use of Battersby by hooking on the bottom of Battersby the British patent, Defendant's Exhibit 44-12, the one you have in your hand.

The Witness: Well, I answered that by saying it depends how much resistance these non-splash devices have. I don't know. It may happen to work; it may happen not to work.

Mr. Freeman: If you used one perforated metal sheet and it didn't work, might you use two?

The Witness: What kind of metal disc are you talking about? I don't know. I have to experiment and see.

Mr. Freeman: You would have to experiment and see?

The Witness: Yes, sir.

Mr. Freeman: Now, in your case, the demonstrations you made, we experimented by using one or more screens until we got the right resistance?

The Witness: Exactly.

Mr. Freeman: And doesn't the British patent teach you to use one or more perforated metal sheets?

The Witness: Yes, but that's not when there's air involved. We can demonstrate very easily in this court and show that a device which is anti-splash for water coming out of a faucet, if it's put at the end of a device called (Tr. 849):

an aerator, it won't work. It may work, but it may not work. As we shall demonstrate in example, it doesn't work, a perfect non-splash device you have taken off the tap on a faucet, where it's non-splash, and attached to the outlet end of a sharp aerated flow, it may not work at all.

The Court: Well, I don't know whether I understand the question myself or not, but, if I do, I don't believe that your answer covers the question Mr. Freeman has asked you. Now I understand the question to mean this: that if you will take off that last attachment right there on Battersby and, in lieu of it, put on it the attachment described in the British patent—

The Witness: Yes. My answer, Your Honor, was—

The Court: (Continuing)—would that not produce a coherent stream of aerated water.

The Witness: My answer was it may or may not, depending on the resistance offered by that anti-splash device.

• • •

(Tr. 862):

Q. Now the device we have here which I understand you brought into this country, which is Exhibit 65, that has a metal ring on the inside; correct?

A. Yes.

Q. When was this brought into the United States?

(Tr. 863):

A. I brought it in 1937.

Q. When in 1937?

A. Oh, I came in June, and I don't know whether some were sent to me as samples, because I had brought some with me and I don't remember whether some more were sent to me from the Zecchini Company, and I demonstrated this and have shown to the Chicago Faucet Company and the Acushnet, who designed upon that.

Q. Did you show it to anyone else?

A. I suppose I did. I don't remember.

Q. Did you use it in your room in hotels in this country, going from place to place?

A. Only for demonstration.

Q. You used it for demonstration?

A. Yes.

Q. How many people did you demonstrate it to?

A. I don't remember.

Q. A dozen or more?

A. Maybe a dozen; I don't know.

Q. And you demonstrated it as a device that was of a commercial character in France?

A. That was the type of aerator made in France and had to be redesigned in this country.

Q. I didn't ask you if it had to be redesigned. I

(Tr. 864):

asked you if you were demonstrating the physical commercial device that was made in France that you brought into this country in 1937.

A. Those were the samples made. I don't believe they were yet in the French market, but I'm not sure about it.

Q. Does that differ from what actually went on the French market?

A. Later on? No, it is not; it is the same.

Q. When you brought it over, all the representations made to the Chicago Faucet Company or the Acushnet people or anybody you demonstrated it to were as a device which was being manufactured by your licensees in France?

A. Yes, I told them it was being made by my French licensees.

Q. And the demonstrations were made by you?

A. I showed it to them.

Q. And the demonstrations were made by a faucet that was turned on and off?

A. Yes.

Q. That was in 1937; you are sure of that?

A. Oh, definitely.

• • •

(Tr. 867):

Q. Now I am going to ask you when did you first disclose to anyone in this country the idea of a restricted orifice added to the aerator of your first patent?

A. To my licensees, the Chicago Faucet Company, in the beginning of December, because our agreement was signed December 2nd—it might have been the end of November—and to the Acushnet Process Company, with whom the contract was concluded sometime in the fall of 1937.

Q. And the disclosure then was, as I understand it, a type of device corresponding to your French licensee's

(Tr. 868):

manufactured device?

A. Yes, the whole disclosure about everything regarding my invention.

Q. Now, Mr. Aghnides, isn't it a fact that the two French patents that are referred to in your license to your French licensee, that one has to do with the so-called adaptor of your early U. S. patent number 2,071,780?

A. I believe so, yes.

Q. And the latter one, which is number 800,069, is the French patent corresponding to either your British patent or your Belgian patent which we have heretofore talked about?

A. Yes.

Q. And do you find in the French patent any restricted orifice?

A. No. That is my first patent.

Q. Well, this is the one that's referred to, one of the two that's referred to, in the French license agreement that you introduced this morning?

A. That's right.

Q. And can we agree that the other patent referred to in your French license agreement is directed to an adaptor for an aerator or some such device?

A. The tap-connector patent, yes.

(Tr. 869):

Q. Does that show, if you recall, a restricted orifice?

A. No, it does not.

Q. Then, in so far as the license agreement, it had nothing to do with the invention we are now talking about directed to a restricted orifice upstream of the aerator?

A. No, except that I gave the specifications and the drawing, as you see, and they had to put it in and they put it in.

Mr. Adams: The agreement was put in merely to establish the date, not to establish what the French licensee made.

Mr. Freeman: Then you are conceding that neither of these two patents have any disclosure with respect to the restricted orifice?

Mr. Adams: That is my belief, and the witness has so stated, I believe.

The Witness: That's right.

* * *

(Dep. 1):

IN THE UNITED STATES DISTRICT COURT

* * (Caption—Civil Action No. 857-G) * *

The deposition of Earl E. Brown, Henry A. Theed, Denis P. Ganey and Alfred F. Strang, taken by the defendant in the above entitled case before S. Anita Man, Notary Public of Cook County, Illinois, on the 24th day of August, 1955, at the offices of Bair, Freeman and Molinare, 135 South LaSalle Street, Chicago, Illinois, pursuant to notice hereto annexed.

* * *

(Dep. 3):

EARL E. BROWN, called as a witness by the defendant, having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Freeman:

Q. Will you please state your name?

A. Earl E. Brown.

Q. And where do you reside?

A. 600 North Prospect Avenue, Park Ridge, Illinois.

Q. And your business?

A. I am president of the Chicago Faucet Company.

Q. Going back to about 1937 or 1938, what was your business then?

A. The same, only I was not president.

Q. What was your official connection with the company at that time?

A. Secretary.

Q. How long have you been with the Chicago Faucet Company?

A. Forty-five years.

• • •

(Dep. 7):

Q. I hand you a photostat, page 21 of Domestic Engineering, a publication dated March, 1938, and will ask you if there is there shown the adapter and Softflo aerator about which you have heretofore testified.

A. There is.

Q. Your company, I take it, advertised in Domestic

(Dep. 8):

Engineering?

A. Yes, sir.

Q. You recall that, in addition to the fact that you are seeing the paper that I just handed you?

A. Oh, yes.

Q. I mean, you independently recollect it?

A. Oh, yes.

Q. And what was the purpose of taking an ad in Domestic Engineering, the one that you have in your hand?

A. To tell the trade, that is, the plumbing trade, this new development; what it was and what it did; try to popularize it with the plumber.

Q. Was it for the purpose of trying to sell these units?

A. Yes.

Q. In other words, the advertising for the normal purpose of creating a demand?

A. Yes.

Q. And I take it that was an ad that your company paid for?

A. Yes, sir.

Mr. Freeman: I am going to offer a photostatic copy of page 21 of Domestic Engineering of March, 1938, as (Dep. 9):

Defendant's Exhibit 19, and I understand from both Messrs. Hamilton and Reddy that there is no objection to the use of the photostat.

Mr. Reddy: That is being marked in the deposition for identification?

Mr. Freeman: I am offering it as a part of the deposition. It will have to be re-offered when the deposition is read. If you have any objection you will have to make it now.

Mr. Reddy: No.

(The document above referred to was marked Defendant's Exhibit No. 19 and offered in evidence.)

* * *

(Dep. 17):

By Mr. Freeman:

Q. Prior to the time that you entered into your negotiations with Aghnides, I understood you to say that your company made a faucet that had an internal thread, sometimes referred to as a female thread, at the lower end.

A. That is correct.

Q. What were the threads then used for prior to your association in any fashion with Mr. Aghnides?

A. We screwed into that thread a device known as a Quixtop, which was a name which we registered.

Q. And what was the purpose of your trade-mark Quixtop—is that the word you used?

A. Yes.

Q. —device?

A. The purpose was to cut off the drip that followed the closure of the faucet unit and also to solidify the (Dep. 18):
stream, thereby delivering a better flow of water.

Q. Did that Quixtop device include a screen that went across the entire area of the faucet at the lower end?

A. Well, I don't want to be technical, but it went across the opening in the Quixtop device. It wasn't quite as large as the opening in the spout.

Q. Fine. I didn't mean to be technical, either, but I was trying to merely get a word picture of your device.

A. Yes.

Q. And then do I understand,—you have already said that there were screw threads at the lower end of the faucet.

A. Yes.

Q. Into which a Quixtop device was screwed into?

A. Yes, sir.

Q. And that Quixtop device included a screen through which the water from the faucet had to pass before it could get into the kitchen sink.

A. That is correct.

Q. And the Quixtop device then, I take it, included a screen and some band member which had the screw (Dep. 19):
threads fixed to it which coacted or screwed into the faucet.

A. Now you are talking like a lawyer.

Q. I am trying to talk so that the Judge will understand it.

A. Well—

Q. The Quixtop device had an opening in it, is that correct?

A. Yes.

Q. And that opening had a screen extending across it?

A. Yes.

Q. And the Quixtop device then had its opening of less diameter than the faucet above it?

A. That is right.

Q. Now, when you made your adapter that is part of your Softflo unit, did you continue with your drip check, as I call it, or Quixtop device?

A. If I understand your question correctly, we continued the use of a screen in the inlet end of the adapter. Or do you mean when we didn't use the Softflo did we use the Quixtop? I am not sure of your question.

Q. No. What I meant is, when you started using your Softflo along with your faucet, did you then still hang on (Dep. 20):

to or keep the benefits that you got from your Quixtop device?

A. We still continued to use the screen.

Q. And where was that screen located in the adapter?

A. Well, substantially at the top.

Q. And did you provide an extension or a shoulder on the inside of the adapter so that the screen wouldn't push clear through?

A. Yes.

Q. And that shoulder then formed an opening in the adapter of less diameter than the diameter of the faucet itself, is that correct?

A. Correct.

Q. And that opening likewise was of less diameter than the diameter of the aerator itself?

A. Yes.

Q. The aerator was, using the expression, more closely related to the diameter of the faucet than the opening of the adapter?

A. That is correct.

Mr. Hamilton: Will you please read that question?

(Record read.)

The Witness: I answered that understanding that you
(Dep. 21):
meant the diameter of the spout outlet of the faucet. I think you said the faucet.

Mr. Freeman: Yes, of the spout outlet of the faucet.

Off the record.

(Discussion off the record.)

By Mr. Freeman:

Q. As illustrative of the adapter of the kind shown in the March, 1938, issue of Domestic Engineering, Defendant's Exhibit 19, I hand you a drawing which is now in a large bound volume which your company produced, and ask you if the adapter, under which is marked "Present," and colored green, represents the adapter of the kind first used by your company.

A. To the best of my recollection, it is.

Q. And I take it that the initials A. C. Brown are recognized by you as that of your father?

A. That is right.

Q. And the books that you have produced are the books kept by your company in the regular course of its business?

A. That is correct.

Q. And are the books of the kind that you rely on in the operation of your business?
(Dep. 22):

A. Yes, sir.

Q. Now, I note on the upper portion of the green adapter a sort of curlicue or wavy line, and I will ask you if that represents the screen of your so-called Quixtop device, is that illustrative of it?

A. Whether it is the exact screen of the Quixtop, I am not sure, but it certainly is similar, close to it.

Q. Perhaps I should ask the question, within the adapter of the device, as illustrated in the March, 1938, issue of Domestic Engineering, there was a screen at the upper end.

A. Yes, sir.

Q. And that screen was in the enlarged, or in an enlarged opening of the adapter, enlarged as distinguished from the throat or restriction that we find in the middle of the adapter, is that correct?

A. Yes, it was.

Q. And is that the way your company began the actual sale of its Softflo aerator; that is, including an adapter with a screen at the upper end thereof?

A. Yes, sir.

Q. Now, what is your best recollection as to when your company actually began the sales of these devices which (Dep. 23):
we have referred to as the Softflo aerator and the adapter therefor?

A. Well, I should say early in 1938.

Q. These ads that we have referred to, let's take the March, 1938, ad, by the time that ad appeared in the paper or in the publication, had your company actually manufactured aerators of the Softflo type?

A. Undoubtedly we had.

Q. Did your company use any of them in your plant for experimental purposes or for illustrative purposes to determine their operative characteristics before you put your ad in the publication?

A. I seem to recall that we tried some at home; that is, my father at his house and I in mine.

Q. And do you recall whether or not any of them were used in the plant, in your own plant; I mean, in the wash basins?

A. I know what you mean. I don't believe so.

Q. Now, your sales records, I understand, going back to 1937 and 1938, have since been destroyed.

A. Yes, sir.

Q. Or are now not available.

A. Yes, sir.

Q. And I take it a good bit of those papers were (Dep. 24):

disposed of during the paper drive when we had our late war.

A. Yes, sir.

Q. But your engineering records of the kind that we have here, these records, were preserved?

A. Yes, sir.

* * *

I am going to offer the drawing of the Chicago Faucet Company, which is colored, illustrating a cross section of an aerator and an adapter which was referred to by the witness, bearing the pen and ink initials A. C. B., and for the purposes of the record, the witness merely identified (Dep. 25):

the device shown on the lefthand side, having the word "Present," there below.

Mr. Hamilton: Are you offering this?

Mr. Freeman: Yes, as Defendant's Exhibit 25.

(The document above referred to was marked Defendant's Exhibit No. 25 and offered in evidence.)

(Discussion off the record.)

Mr. Freeman: By consent of counsel, in view of the fact that the drawing just offered in evidence as Defendant's Exhibit 25 is a permanent record of the Chicago Faucet Company, and being in color, they agree that a duplicate thereof may be made and colored corresponding as closely as possible to the original.

That is all from Mr. Brown.

* * *

(Dep. 32):

REDIRECT EXAMINATION

By Mr. Freeman:

Q. After you took your license or made your agreement with Aghnides in December of 1937, you began paying him a monthly minimum royalty, starting with January of 1938, of some $80 or $83 a month, is that correct?

A. I believe that is correct, yes, sir.

Q. And I take it that you made reports to Mr. Aghnides from time to time as to the number of units sold and made the royalty payments as were due to Mr. Aghnides?

(Dep. 33):

A. I am sure we did.

Q. You used the term in connection with your Quixtop device that it solidified the stream. Can you describe that a little more? What do you mean by it solidified the stream?

A. Concentrated it into a solid column.

Q. Made it more coherent?

A. Yes. Without something of that kind you might have a little throwoff to the side.

Q. In other words, then, for some distance after the water left the faucet with the Quixtop device on, the water remained in a uniform column as distinguished from spreading out and splattering around, is that correct?

A. Yes.

Mr. Freeman: Off the record.

(Discussion off the record.)

Mr. Freeman: It is agreed by counsel for the respective parties that a page from the general ledger of the Chicago Faucet Company, which ledger is in loose leaf form, may be offered in evidence as Defendant's Exhibit No. 26, the page being entitled, "Aghnides Royalties," and has to do with the year 1938.

(Dep. 34):

(The document above referred to was marked Defendant's Exhibit No. 26 and offered in evidence.)

• • •

(Dep. 84):

ALFRED F. STRANG was called as a witness by the defendant, and having been first duly sworn, testified as follows:

DIRECT EXAMINATION

By Mr. Freeman:

Q. Will you please state your name

A. Alfred F. Strang.

Q. And your residence?

A. 123 Fairview Avenue, Park Ridge, Illinois.

Q. By whom are you employed?

A. Chicago Faucet Company.

Q. And how long have you been with the company?

A. Thirty years.

Q. What is your present capacity with the company?

A. Purchasing.

Q. What was your capacity with the company in 1937 and 1938?

A. Purchasing and production. Still purchasing and production.

Q. How long have you been in purchasing, Mr. Strang?

A. Since 1934.

(Dep. 85):

Q. Are you familiar with the device that has been referred to as Softflo?

A. Yes, sir.

Q. And you know that to be an aerator?

A. Yes, sir.

Q. And you know it to be attached to the end of a faucet by means of an adapter?

A. Yes.

Q. Can you read drawings; I mean, do you understand drawings?

A. I am not an engineer, but I have a lot to do with drawings in my work.

Q. And as purchasing, or as we sometimes call them, purchasing agent, it was your duty with the company to purchase outside parts used by Chicago Faucet Company?

A. Yes, sir.

Q. Are those parts purchased in accordance with part numbers as illustrated on drawings?

A. They are.

Q. Did you you have anything to do with the purchase of parts for the Softflo aerator?

A. Yes, I did.

Q. And were they purchased by use of a drawing illustrating a particular part number?

(Dep. 86):

A. They were.

Q. Now, I have a drawing here that make reference to a part number, 1-123.

A. Yes, sir.

Q. Would you have any record showing when that particular part number was first purchased for the Softflo aerator?

A. Yes, sir.

Q. Will you turn to that record and give me the date of the first purchase, and I might add, for the purpose of the record, the witness has in his lap a large book, loose leaf in form, including a large number of sheets, appearing to be records from the Chicago Faucet Company,

which has been produced in response to subpoena directed to the officers of the Chicago Faucet Company.

Now you can proceed with your answer.

A. On February 15, 1938, we received the first of the 1-123 screens, 1,020 of them. That is the invoice date. We had them probably one day before or maybe after.

Q. In other words, during the month of February you had part No. 123 for the Softflo aerator?

(Dep. 87):

A. Yes, sir.

Q. And can you tell me the name of the company that you bought that from; does that appear on the record that you have here produced?

A. Quadriga Manufacturing Company. Do you want their address?

Q. Yes.

A. 213 West Grand Avenue.

Q. In Chicago?

A. Yes, sir.

Q. And I note above the name Quadriga you have 2-15-38, and I am going to ask in whose handwriting is that date?

A. That I do not know.

Q. But the record is kept under your supervision?

A. Yes, sir.

Q. And what does the 1-123 mean?

A. It is the number that is assigned to the part by the engineering department.

Q. And under the heading "Vendor" on the blank that you have, or the form, appears the figure 1020. What does that indicate to you?

A. Well, that indicates the number of pieces we have received, but if you will note the vendor's name is not under the column.

(Dep. 88):

Q. The vendor's name is under the date column?

A. That is right.

Q. Was it your custom to put the date of the invoice, when you knew it, under the date, along with the vendor's name?

A. Yes, it was.

Q. Does the $8.00 per M, which appears under the column "Quantity," indicate the price per thousand?

A. That is right.

Q. And the total invoice was $8.16 for the part No. 123?

A. That is right.

Q. What was part No. 124?

A. That is another screen that was used in the lower part of the aerator.

Q. And that too, I take it, was purchased from Quadriga?

A. Yes, sir.

Q. And under what date did that come into your plant?

A. The invoice date is February 15, 1938.

Q. And the quantity?

(Dep. 89):

A. 1,070.

Q. And again the price is $8.00 per thousand, is that correct?

A. Yes, sir.

Q. I note also that there appears part No. 1-125. What was that part?

A. That was also a disc. That was made out of perforated brass sheet. I think we designated it as a disc with many holes as opposed to a disc with few holes. That was added later.

Q. Now I note on the drawing which has been offered as Defendant's Exhibit 31, part No. 123. Does that appear

to be a round object of screen material?

A. Yes, sir.

Q. And that is what is referred to as the product invoiced to your company on February 15, 1938, by Quadriga Company?

A. Yes, sir.

Q. I note also another screen-like member also circular in outline, as part No. 124. That likewise was made by Quadriga?

A. Yes, sir.

Q. And likewise invoiced to your company on February 15th?

(Dep. 90):

A. Yes, sir.

Q. 1938?

A. Yes, sir.

Q. And I notice also on Defendant's Exhibit 31 a disc which is marked "Perforated disc," part No. 1-125. Does that have reference to the 1,020 received or invoiced to your company on February 15, 1938?

A. Yes, sir.

Q. Now, I notice part No. 122. Was that purchased by your company from the Johns-Manville Company?

A. Yes, sir.

Q. And that part No. 122 is likewise shown on the drawing, Defendant's Exhibit 31, is that correct?

A. Yes, sir.

Q. I notice that the reference identification to part No. 122 received from Johns-Manville opposite J-M Co., and under "Vendor," 2,000,—that is the second order, is it not, for part No. 122?

A. Yes, sir.

Q. I note on the very top of the page arranged in columns that part No. 122 was ordered from JMC, mean-

ing Johns-Manville Company; that the quantity was 1,000, and the price was $3.00 per thousand, is that correct?

A. That is right.

(Dep. 91):

Q. Was the entry as to the purchase of Part No. 122 made before or after February 15, 1938?

A. It was received before. That is why it is entered before this entry here. Whoever made this entry neglected to put down the date. I might mention these two entries are my own.

Q. Oh, that is your own handwriting?

A. I do make mistakes. These two entries are mine. These are not.

Q. The first entry for the part No. 122 for the Softflo aerator is in your handwriting?

A. Yes, sir.

Q. Now, how about the second entry for part No. 126?

A. That is my handwriting, too.

Q. And who was that purchased from, if you recall?

A. Illinois Coil Spring Company.

Q. And that is illustrated on Defendant's Exhibit No. 25 as part No. 1-126?

A. That is right.

Q. And likewise that part No. 126 referred to as a separator ring part No. 126, is shown on Defendant's Exhibit 27, is that correct?

(Dep. 92):

A. That is right.

Q. I am going to ask you whether or not those parts were received by you; I mean, parts No. 1-126, before or after February 15, 1938?

A. I would say before, because the entry is made before that date.

Q. And is that entry, too, in your handwriting?

A. Yes, sir.

Q. Now, do you know who made the part No. 121, which is the adapter?

A. Well, that was made in our shop. We make parts like that out of brass rod.

Q. How about the making of the body part, 120?

A. The same thing.

Q. So that with the parts that were received or purchased from outside sources, that is, parts 122, 126, 123, 124 and 125, along with those parts that were made by your company, to-wit, part 1-121 and part 1-120, that made up the aerator and adapter, is that correct?

A. Yes, sir, that is correct.

Q. Do you have any recollection of seeing any adapter and aerator in an assembled condition very much as illustrated in Defendant's Exhibit 27; I mean, in an assembled unit, including these parts that were brought into your plant some time in February of 1938?

(Dep. 93):

A. I can't say that I remember them at this time, no. I remember seeing lots of them, but I wouldn't say that was at that time. I don't remember that.

Q. Now, these parts that were ordered, they were for production units, were they not?

A. Yes, sir.

Q. I mean, when you buy a thousand parts, that is not experimental.

A. No, sir.

Q. And when you buy, as here indicated, 1,000 or 1,325, were those parts bought by you for use in connection with the Softflo aerator?

A. Yes, sir.

Q. For saleable units, or units that were to be sold?

A. Well, yes, I would say so.

Q. In other words, I am asking you whether or not the parts that you brought were for production purposes as distinguished from experimental purposes.

A. Yes

Q. For production purposes?

A. Yes, sir.

(Dep. 94):

Mr. Freeman: I would like to offer in evidence a photostatic copy of the purchase date or sheet that has been referred to by the witness as Defendant's Exhibit 32.

(The document above referred to was marked Defendant's Exhibit No. 32 and offered in evidence.)

By Mr. Freeman:

Q. Incidentally, the book that you have here today, which contains the sheet which I have just offered in evidence as Defendant Exhibit 32, is that a current record book?

A. Yes, sir.

Q. It is used right now?

A. Every day.

Q. So that the parts purchased in 1937 or '38 were recorded in a book that you keep similar record in, in a book today?

A. That is right.

Q. The same kind of a book?

A. Yes, sir.

• • •

(Dep. 1):

In the United States District Court

• • (Caption—Civil Action No. 857-G) • •

Deposition of S. H. Kress & Company, by C. H. Williamson, Assistant Secretary, taken by plaintiff pursuant to order of Hon. Johnson J. Hayes, filed December 1, 1954,

at the offices of Pennie, Edmonds, Morton, Barrows & Taylor, Esqs., 217 Park Avenue, New York, N.Y., on December 6, 1954, at 3:45 p.m., before George Wolf, a notary public of the State of New York.

• • •

(Dep. 2):

C. H. WILLIAMSON, called as a witness by plaintiff, being first duly sworn by the Notary Public, testified as follows:

EXAMINATION BY MR. ELY

Q. Please state your name, age and residence?

A. C. H. Williamson; age 49; residence, 293 Hollywood Avenue, Tuckahoe 7, New York.

Q. And you are with the S. H. Kress & Company?

A. S. H. Kress & Company, yes, sir.

A. S. H. Kress & Company, yes, sir.

Q. What position do you hold?

A. Assistant secretary of the company.

Mr. Ely: Note that this is an adverse witness, if you will, please.

Q. How long have you been with the Kress Company?

A. Twenty-six years.

Q. How long in your present position?

(Rep. 3):

A. Well, as assistant secretary I don't know the exact date. I would say three years, three, three and a half years.

• • •

(Dep. 59):

EXAMINATION BY MR. LETTVIN

Q. Mr. Williamson, just one question. Do you know who is in control of the defense of this lawsuit?

A. Well, S. H. Kress & Company is.

Mr. Lettvin: That is all.

By Mr. Ely:

Q. Why is S. H. Kress & Company in control of a lawsuit concerning an aerator made by Melard Company? Why are you in control of a suit concerning an item manufactured by the Melard Company, of which you sold 400 or so? Why?

A. Inasmuch as our company has been served, we would control that lawsuit and could hire whatever attorneys we wish to hire.

Q. And you say you are in control of this litigation?

A. Yes, sir.

Q. How do you know the S. H. Kress & Company is in control of this litigation? Did you make that decision?

A. Well, I don't make decisions for the legal division, no, sir.

(Dep. 60):

Q. Who made that decision?

A. Well, our attorneys make that decision.

Q. Who told you that they were in control of the litigation?

A. Our attorneys.

Q. Who? I mean, that you were in control.

Mr. Lettvin: I object. If he says this was between his attorneys and himself, it is privileged.

Q. And the only reason that you know you are in control of this suit is because your attorneys have told you that; is that right?

A. Yes, sir, I would think that was a good reason.

Q. Did anyone at the head of your company, any officer, make that decision that you would control this litigation?

A. Well, our general counsel is an officer of the company.

Q. And did he make that decision?
A. It was made under his direction, yes, sir.
Q. Do you know that?
A. Well, I wasn't there.
Q. You don't know that, sir?
(Dep. 60a):
A. I wasn't there.
Q. You don't know that, do you?
A. No, sir, not firsthand I don't.
Mr. Ely: That is all.
Mr. Lettvin: That is all.

(Whereupon, Mr. Williamson's deposition was closed.)

• • •

(Dep. 1):

IN THE UNITED STATES DISTRICT COURT
(Caption—Civil Action No. 857-G)

Deposition of S. H. Kress & Company, by Arthur F. Guerber, Assistant Secretary, taken by plaintiff, pursuant to notice of taking deposition, motion for inspection and copying and order of Hon. Johnson J. Hayes, United States District Judge, at the offices of Pennie, Edmonds, Morton, Barrows & Taylor, 247 Park Avenue, New York, N. Y., at 2:00 p.m., January 6, 1955, before George Wolf, a notary public of the State of New York.

• • •

(Dep. 6):

ARTHUR F. GUERBER, called as a witness by plaintiff, being first duly sworn by the notary public, testified as follows:

EXAMINATION

By Mr. Ely:

Q. What is your address, Mr. Guerber?

(Dep. 7):

A. My business address?

Q. Both.

A. Home address is 201 East Palisades Avenue, Englewood, New Jersey. My business address is 114 Fifth Avenue, New York.

Q. Are you employed by S. H. Kress & Company?

A. Yes.

Q. Are you an officer of S. H. Kress & Company?

A. Yes.

Q. Are you employed in the legal division of S. H. Kress & Company?

A. Yes.

Mr. Ely: Please note the adverse character of this witness on the record.

Q. Are you a member of the bar?

A. Yes, sir.

Q. Of the State of New York?

A. Yes, sir.

Q. Are you salaried?

A. Yes.

Q. Are your offices with the offices of S. H. Kress & Company?

A. Yes; and I have an office at 218 Fulton Street.

Q. Do you do legal work for others than the company?

(Dep. 8):

A. No.

Q. You are exclusively hired by the company?

A. That's right.

• • •

(Dep. 11):

Q. Who is the head of the legal department at S. H. Kress & Company?

A. I am.

• • •

(Dep. 15):

Q. You say Mr. Lettvin called on you on October 19, 1954, with respect to the interrogatories which had been filed in the case in North Carolina. Those interrogatories were filed November 7, 1954. I am just saying that for the record.

Did you have anything to do with the preparation of the answers to the interrogatories?

(Dep. 16):

A. Yes.

Q. Did you furnish the information to Mr. Lettvin from which the answers to the interrogatories were prepared?

A. Yes.

Q. When did S. H. Kress & Company employ Bair, Freeman & Molinare to represent them in this case, if they ever did so?

A. Well, I would say October 19th would be the date that we understood that they were acting as our attorneys.

Q. Who told you that they were acting as your attorneys?

A. I told them.

Q. You told them?

A. Yes, sir.

Q. And did you at that time retain Bair, Freeman & Molinare as your attorneys?

A. Well, they understood they were acting for us.

• • •

(Dep. 19):

Q. Did you at any time retain Bair, Freeman & Molinare as your attorneys in this case?

A. They are our attorneys in the case.

Mr. Reddy: Would you answer that question.

By Mr. Ely:

Q. Please answer the question.

(Dep. 20):

Mr. Reddy: You realize, apparently, that you have not yet testified that you have retained them. You specifically disclaimed so testifying.

Now Mr. Ely asks you have you ever retained them.

A. I would say we retained them, yes. I would have to say that.

Q. On October 19, 1954?

A. No, I don't say that. I would say on October 19th we acknowledged that they were our attorneys.

Now, as of when we retained them retroactively I can't say, but I would have to say we retained them, yes.

• • •

(Dep. 28):

"Q. Then you believe that this letter of November 2, 1954, Plaintiff's Exhibit 2, is an undertaking by the Melard Manufacturing Company to take over the defense of this action as requested in your letter of May 20th?")

A. Yes, if you understand what we mean by taking over

(Dep. 29):

the defense of the action. I certainly didn't mean that Melard would be substituted as the defendant in the action. My idea is, and we have hundreds—we buy 20,000 different items—we can't check into the patentability of any single item. When a question like this arises, we always consult the supplier.

First we tell the claimant that we have no intention, no desire to infringe or trespass upon the patent rights and that we would like to investigate.

In this case we were never notified prior to this suit. Ninety-nine out of a hundred cases we are given the opportunity of discontinuing sale and dismissing the suit because we are an innocent bystander in the whole affair.

In this case the suit was just dropped right in our lap. We had no alternative except to turn it over to the supplier and say, "Here, you make good on it."

He has to defend the suit—not defend the suit, but he has to provide counsel and pay for counsel who will defend the suit for Kress, but I can settle this today with you fellows, if you want. We are not buying any. We can call the whole thing off any time you want.

(Dep. 30):

Therefore, I assume and I know that I keep full control of the suit, and, as I said, when Mr. Lettvin walked into our office that day, if I didn't like his approach or I didn't like the way he was handling it and what he had done, I could say, "Look, we are not interested in this thing at all. There is no money as far as we are concerned in it, and we are not selling the product now. We are not buying it. So let's call the whole thing off and we will just settle the whole affair."

* * *

(Dep. 37):

Q. Does the S. H. Kress & Company have any interest in the Melard Manufacturing Company?

A. No, sir.

Q. Or any connection therewith?

A. No, sir.

Q. You are not interested in the manufacture of aerators?

A. We do not manufacture anything.

Q. You are not interested in the manufacture of aerators?

A. We are not interested in any manufacturer.

Q. Is it a matter of interest to you whether this Mel-O-Flo aerator is continued to be manufactured, to S. H. Kress & Company?

A. That is a little different. What is the question? (Dep. 38):

Q. Is it any interest to the S. H. Kress & Company whether the Mel-O-Flo aerator continues to be manufactured and sold?

A. Pecuniarily or morally or what?

Q. Any way.

A. Well, we sell the item and naturally we would rather win an infringement suit than lose it.

Q. Is there any particular reason you are interested in keeping the Mel-O-Flo aerators going?

• • •

A. My only answer to this—

The Witness: If you don't object, Mr. Lettvin.

Mr. Lettvin: I can't stop you from answering.

(Dep. 39):

A. (Continuing) —is that we had no choice. You threw us into it.

As I say, 999 out of 1000 cases, the claimant comes to us and if they can get Kress to drop it, they have won a victory, and these people didn't even come to us. This is the first time we ever heard of it. They threw a suit in our lap.

Naturally, we would rather win the suit than lose it, but, as I say, we can settle it today, if you would like.

• • •

(Dep. 41):

Q. Are you aware of the fact that Bair, Freeman & Molinare represent the Melard Manufacturing Company with respect to the Mel-O-Flo aerators?

A. Sure. That's how they came into the case.

Q. And you understand that they still represent Melard on manufacture of the Mel-O-Flo aerators?

A. I can't think of anybody better able to take over the defense of this action, because they know the defense already for Melard.

Q. That isn't just what I asked you.

A. Yes.

Q. Your answer to my question is "Yes"?

A. Yes.

Q. Then, as you see it, you have interests in common with respect to this litigation?

A. We have no interest in common. Our only interest is winning the lawsuit that has been filed against S. H. Kress & Company.

Q. That is—

A. Without any cost to the company.

Q. That is, either a decision for invalidity or non-infringement of Aghnides' patents?

(Dep. 42):

A. Except for personal likes and dislikes, there would be absolutely no interest to S. H. Kress & Company except to win the lawsuit.

Q. By winning the lawsuit, this being a patent case, that would be, as you understand it, that the patent would be found invalid or not infringed by the sale of Mel-O-Flo aerators?

A. That's right.

• • •

(Dep. 50):

EXAMINATION BY MR. LETTVIN:

Q. Mr. Guerber, did S. H. Kress & Company ratify Bair, Freeman & Molinare's preparation and filing of the answer in this case?

A. Yes.

Q. With respect to this indemnity agreement which is marked Plaintiff's Exhibit 2?

A. What is the date of that?

Q. November 2, 1954.

A. Yes.

Q. Would you expect that indemnity agreement to pertain to claims that other patentees would make against S. H. Kress & Company for their manufacture and sale of the product in question?

A. I am not sure that I understand you, but as far as I am concerned—let me see my letter—it is a complete

(Dep. 51):

indemnification for any claims that are made for the sale of Mel-O-Flo aerators.

Q. And that would pertain if other patentees had charged the product to be an infringement, is that right, patentees other than Aghnides?

A. It would be a complete indemnification for any claims made against us by anybody.

Mr. Lettvin: That's all.

• • •

(Dep. 51): EXAMINATION BY MR. ELY

• • •

(Dep. 55):

The Witness: There must be some reason you don't want to settle the case. We are willing to settle it.

Mr. Ely: I think that is a matter of our own affairs.

The Witness: That's all right, too, but you have to admit, Mr. Ely, that it is not common never to make a claim against the defendant before you start suit and surprise him with the issuance of a summons and complaint without making some attempt to have him remove them from sale or acknowledge an infringement or something to that effect.

That's why this case strikes me as being so unusual.

* * *

Mr. Ely: I say that any settlement of this case would have to bind the Melard Manufacturing Company as well as the Kress Company, because it is perfectly obvious that (Dep. 56):

they are participating in this case.

If there will be an injunction issued against both the Kress Company and the Melard Manufacturing Company, then I will settle this case.

The Witness: You mean in the State of North Carolina?

Mr. Ely: I mean against the Melard Manufacturing Company, which is in New York here, against the principal, the manufacturer of the device.

If the Melard Manufacturing Company is willing to agree to recognize the validity and infringement of the patent and agree to a consent decree, I will settle the case with you as well.

Mr. Wiggins: I suggest you might have sued Melard here in New York, if that's what you want.

Mr. Reddy: Now that we are on the record we might just as well say that since patent counsel for the Melard Company is now counsel for the Kress Company it is almost as simple a matter to travel from Chicago to North Carolina as from Chicago to New York. It is equally easy for the Melard Company to defend that case in North Carolina as it is to have same counsel defend the Kress case in North Carolina.

(Dep. 57):

The Witness: I suggest that maybe we change counsel if you are willing to settle the case with just Kress. We would be pleased to change counsel and take different counsel and settle as to Kress.

Mr. Ely: I told you that I will settle this case if the Melard Manufacturing Company is likewise bound by the decree in this case of validity and infringement.

The Witness: Melard isn't a party to this case. Kress happens to have stores in North Carolina.

• • •

Mr. Ely: We expected to have an out and out avowal of the truth of the matter, that the Melard Company is defending the case instead of playing hide and seek, as you have been doing. Instead of coming out and telling the truth of the matter—

(Dep. 58):

The Witness: The Kress Company would not enter into any such arrangement. We do about two hundred million dollars in sales a year and we are not interested in either side in this case except to win a lawsuit against Kress—

Mr. Lettvin: You mean that was brought against Kress.

The Witness: —that was brought against Kress, and we certainly can't understand the motive, especially when a plaintiff is represented by outstanding and reputable counsel, that they wouldn't come to a reputable company like the Kress Company and say, "Look, boys, you are selling something that infringes. Do you want to take it off sale and let's call the whole thing off or do we have to sue you?"

• • •

(Dep. 1):

IN THE UNITED STATES DISTRICT COURT
(Caption—Civil Action No. 857-G)

Depositions of Sidney Shames and Harold Shames, pursuant to subpoenas duces tecum, dated November 26, 1954, at the offices of Pennie, Edmonds, Morton, Barrows & Taylor, Esqs., 247 Park Avenue, New York, N. Y., on December 8, 1954, at 1:30 p.m., before William Herrick, a notary public of the State of New York.

* * *

(Dep. 3):

SIDNEY J. SHAMES, called as a witness by plaintiff, being first duly sworn by the notary public, testified as follows:

* * *

(Dep. 46):

Mr. Lettvin: The issues of this case—and I am making this statement for the record—the issues of the case between Aghnides and S. H. Kress & Company are validity and infringement of the Aghnides patents. There is nothing else involved and I haven't heard a single question today which was directed toward that subject matter other than the question of whether or not the Aghnides patents or the Aghnides devices were known to this witness.

Mr. Reddy: I would like to refer to what I believe is another issue in the case as between S. H. Kress & Company and Elie P. Aghnides.

It is my understanding of the law that one of the issues in that case can be who is particating or assisting in the defense besides the osttensible defendant.

Mr. Lettvin: There is nothing in the pleadings that would so indicate.

* * *

(Dep. 53):

HAROLD SHAMES, called as a witness by plaintiff, being first duly sworn by the notary public, testified as follows:

DIRECT EXAMINATION

By Mr. Ely:

Q. Mr. Shames, you are, I believe, vice president of Melard Manufacturing Company of this city, are you not?

A. That's correct.

Q. What are your duties with the company?

A. As vice president I handle most of the sales end. It is a small organization and it is not that too finely divided, but that would be a good way of dividing it.

Q. Did you negotiate the sale of a number of Mel-O-Flo Aerators to the S. H. Kress & Company which are covered in this order from S. H. Kress & Company, copy of which is marked Plaintiff's Exhibit 1?

A. Yes.

Q. With whom did you deal at the company when you made that sale?

A. The purchasing agent of that department.

Q. What was his name?

A. I believe his name is Vestal.

Q. Did you make more than one sale of these Mel-O-

(Dep. 54):

Flo Aerators to the S. H Kress & Company during the year 1953?

A. Yes.

• • •

(Dep. 63):

Q. Mr. Shames, I hand you a paper which has been marked for identification by Mr. Lettvin as Defendant's Exhibit 4 in this case, do you recognize that? Have you ever seen that sketch before (handing to witness)?

A. I have seen one similar to it, but I don't know if I have ever seen this particular sketch.

Q. Does that, in your opinion, show the cross section of the Melard Mel-O-Flo Aerator?

• • • •

Q. Will you answer my question, please.

A. This drawing shows the elements of the Mel-O-Flo Jet Aerator.

• • • •

(Dep. 66):

Q. Tell me, Mr. Shames, how does that work; what is your opinion as to how that works?

A. Do you have a copy in front of you so you can follow me?

Q. I will come over there with you.

A. What do you want to know?

Q. How the water enters, how it behaves, how it acts, that is what I want to know?

(Dep. 67):

A. The water comes in at the top.

Q. Go ahead.

Mr. Freeman: Mark the word "top" on top.

(Witness complies.)

A. (Continuing): The aerated mixture leaves on the bottom.

Q. How does that operate, in your opinion?

A. The air comes in through the air ports.

Q. Writ in the word "air."

A. It is marked already.

Q. Yes. What happens to the water, in your opinion?

Mr. Lettvin: Trace the flow of water.

Q. Use the red pencil.

A. All right (witness complies).

Q. What have you drawn in red?

A. That is the incoming water?

Q. What are these lines in red on either side?

A. The incoming water is divided into streams in a series of channels which are arranged in annular fashion. The channels are formed by the guide ring, so labeled, and the teeth of the plug. After the water is led on to the sloping portion of the guide ring, it is directed inward, conically inward.

(Dep. 68):

Q. Then what happens?

A. So that it then strikes the plug.

Q. You mean the streams of water or the jets of water strike the plug; is that right?

A. The water, after it leaves the inclined surface, is then led on to the plug.

Q. What happens when the water hits the plug?

A. Then it is broken up and the water is deflected outwardly and downwardly.

Q. Where does the water go upwardly and downwardly?

A. It goes into the region between the plug and the barrel.

Q. What happens to the water, in your opinion?

A. The water is dispersed. It then meets the incoming aspirated air and is mixed.

Q. Do you think you have drawn the limit of where the water goes?

A. What do you mean by "limit"?

Q. Doesn't the water strike against the side of the casing?

A. More or less.

Q. Then what happens to the water?

(Dep. 69):

A. The water and air then mix and emerge as an aerated stream.

Q. What has been called a coherent aerated stream?

A. What do you mean by "coherent"?

Q. I mean a stream in which the air bubbles are imprisoned in the stream so it is what has been called a coherent stream. You are familiar with the term coherent stream.

A. The air is not imprisoned in the water. The stream is emitted as an aerated stream, which has a whitish color to it.

Q. What imparts the whitish color to the stream?

A. The air bubbles in it.

Q. Is there any aeration of the water in the area between the ring and the neck of the plug, that area which I will mark "X"?

A. You mean above it?

Q. The plug has a diaphragm on top, hasn't it, or a disk on top?

Mr. Lettvin: As S. H. Kress & Company's attorney I am going to ask, with respect to this question, whether the inquirer intends to be bound for the simple reason that there seems to be conflict between that and as expressed in the District Court's opinion; there seems to be some (Dep. 70):

sort of conflict, which appears, from the District Court's opinion, to have been decided one way and which appears to have been argued in contrary manner in the Court of Appeals here in New York here this morning, at which both Mr. Ely and Mr. Hamilton attended, and know of such conflict.

If you intend to be bound by this witness' testimony with respect to that, you may proceed. But as the Kress Company's attorneys, I intend to reserve my objection.

Mr. Ely: I am not bound by what he says. I am simply asking his opinion. I am not bound by his opinion.

Q. In your opinion, does any aeration of the water take place in the area bounded by the underside of the disk, the neck of the plug and the ring or what is known as the guide ring?

A. No, there is no aeration there.

Q. That is, all of the aeration, in your opinion, takes place after the jets of water strike the plug and are thrown off toward the outer casing is that right?

A. That's right.

Q. What is the function of the retaining ring, in your opinion?

(Dep. 71):

A. The retaining ring holds—

Q. No.

Mr. Lettvin: Let him finish.

Mr. Ely: I will withdraw the question.

Q. What is the use of the screen?

A. The screen is placed in the device because in order to sell the device commercially the housewife is used to seeing a screen or a filter, and though this device will work without the screen, we might encounter difficulty in selling the product if you omitted it. The screen is not a necessary element of this device.

• • •

(Dep. 1):

Deposition of Elie P. Aghnides, the plaintiff, taken by defendant pursuant to notice dated November 16, 1954, at the offices of Pennie, Edmonds, Morton, Borrows & Taylor, 247 Park Avenue, New York, N. Y., on December 6, 1954, at 10:00 a.m., before George Wolf, a notary public of the State of New York.

• • •

(Dep. 2):

ELIE P. AGHNIDES, the plaintiff herein, called as a witness by defendant, being first duly sworn, testified as follows:

Mr. Lettvin: Before proceeding with the oral testimony, I would like to ask you, Mr. Aghnides, if you have produced the various documents and things that were referred to in the defendant's motion for inspection and copying which was served upon your counsel in North Carolina?

The Witness: I don't understand the language.

Mr. Ely: I think if he says yes it is all right.

• • •

(Dep. 26):

Q. Have you produced here today a copy of the Belgian Patent No. 406,702?

Mr. Ely: We can bring a copy of that. You didn't ask for that, did you?

Mr. Lettvin: I thought you might have brought it.

Q. You do remember filing an application for patent in Belgium which finally issued as Belgian Patent No. 406,702; is that correct?

A. I do.

Q. And that was filed December 8, 1934?

A. I believe so.

Q. Had you made any devices similar to that shown in the drawings of your Belgian patent prior to filing the application for patent in Belgium?

A. I had, according to some of the drawings shown.

(Dep. 27):

Q. And you had built devices prior to filing the application for patent?

A. Definitely, sir.

• • •

Q. Mr. Aghnides, I hand you a sheet which purports to illustrate on the front and rear side thereof the drawings which appeared in your Belgian patent. Do you recognize those figures?

A. I do.

Q. You say that you made devices prior to filing the application for patent in Belgium; is that correct?

A. Yes, I did.

Q. Did you make a device as shown in Fig. 1? (Dep. 28):

A. Yes, I did.

Q. Did you make a device as shown in Fig. 2?

A. No, I have not.

Q. Did you make a device as shown in Fig. 3?

A. No, I have not.

Q. Did you make a device as shown in Fig. 4?

A. I have not. I shall make an amendment about Fig. 2, which being cut off, I didn't realize that below the cut off portion is supposed to be the end portion of Fig. 1. So I did make a representative of Fig. 2 with resistance means shown in Fig. 1.

Q. But you didn't make any model with respect to Fig. 3?

A. I did not.

Q. And you had never made any model with respect to Fig. 4?

A. No, I did not.

Q. Did you make a model with respect to Fig. 5?

A. Fig. 5, yes.

Q. That is conditioned on the basis that the bottom end is cut off; is that correct?

A. Yes, that's right.

Q. Did you make a model as shown in Fig. 6?

A. I did make a model regarding Fig. 6 as shown in

(Dep. 29):

connection with Fig. 8.

Q. I was going to get to that.

You did make a model as shown in Fig. 6?

A. I did.

Q. Did you make a model as shown in Fig. 7?

A. No, I did not.

Q. Did you ever make a model as shown in Fig. 8?

A. Yes; that's in connection with Fig. 6.

Q. Were those models made prior to your filing the application for patent or subsequent thereto?

You testified that you made the model in Fig. 1 prior to filing the application for patent.

A. Yes.

Q. Now, with respect to Fig. 2, was that before or after?

A. I don't remember whether I made Fig. 2 after filing, but I think I made it before.

Q. Did you make a model of Fig. 5 before you filed the application for patent or after?

A. Before.

Q. Did you make the model of Fig. 8 before you filed the application for patent or after?

A. Before.

Q. Mr. Aghnides, were any models ever made com-

(Dep. 30):

mercially in Belgium in accordance with any of the figures shown in your Belgian patent?

A. Yes.

Q. Which figure?

A. Fig. 1.

Q. Any of the other figures?

A. Commercially, no.

Q. Not even Fig. 8?

A. No.

Q. Or Figs. 2 or 5?

A. No. Of course, this corresponds to Fig. 1. Fig. 5 corresponds to Fig. 1, the plurality of orifices and screens below.

Q. The only difference is where the air inlet is; is that correct?

A. Yes, that's correct.

Q. The air inlet in Fig. 1 being in the side of the casing?

A. In both cases the air inlets are below the perforated diaphragm.

Q. But I said in Fig. 1 the air inlets are in the side of the casing.

A. Also in the other one.

Q. And the air inlet in Fig. 5 is at the upper end of the converging nozzle; is that correct?

(Dep. 31):

Mr. Ely: I think the drawing speaks for itself.

Q. Did you file any applications in foreign countries corresponding with this Belgian patent?

A. I did.

Q. What countries did you file in?

A. United States of America, Germany, where a patent was just granted, France, Belgium, of course, was mentioned, Italy, Spain, England.

Q. Were those all filed within one year after the—

A. They were.

Q. —filing date of the Belgian application?

A. Right. I am sorry. Will you please add Canada, too.

Q. I show you a copy of a file wrapper of an application for patent in the name of Mr. Elie Aghnides, bearing serial No. 52, 923, which I am marking for identification as Defendant's Exhibit 1.

(Application for patent in name of Elie Aghnides, serial No. 52,924, marked Defendant's Exhibit 1 for identification.)

Q. And that represents the history of prosecution of (Dep. 32):
this application in the Patent Office, does it not, in the United States?

A. Yes.

Mr. Ely: What copy?

Mr. Lettvin: Certified copy of the application, serial 52,923.

Mr. Ely: Say that over again.

(Record read.)

Q. Just calling your attention to this file wrapper and comparing the drawings therein on page 14 of that file wrapper with the drawings in the Belgian patent, would you agree with me that there is some correspondence between Figs. 1 of both?

A. What do you mean by "some correspondence"? There is correspondence.

Q. There are small differences, aren't there?

A. Yes.

Q. But in general there is correspondence?

A. Yes.

Q. And the same is true with respect to Figs. 2?

A. Yes.

Q. And with respect to Figs. 3?

A. Yes.

Q. And with respect to Figs. 4?
(Dep. 33):

A. Yes.

Q. And with respect to Figs. 5?

A. Yes.

Q. And with respect to Figs. 6?

A. Yes.

Q. And with respect to Figs. 7?

A. Yes.

Q. There is no figure in the United States application which corresponds with Fig. 8 of the Belgian patent, is there?

A. No, I don't see it.

Q. There is a new Fig. 8 in the United States application?

A. That's right.

Q. And Fig. 9 is just a cross section of Fig. 8 of the U. S. application; correct?

A. That's right.

Q. Mr. Aghnides, I call your attention to a certified copy of the file wrapper of your Patent No. 2,210,846, which represents the prosecution of the application for patent serial No. 182,884 in the United States Patent Office.

That file wrapper represents the history of prosecution of that patent in the United States Patent Office, does it (Dep. 34):

not?

A. It seems to, yes.

Q. I call your attention to page 17 of that file wrapper which shows the drawing and I ask you to compare the drawings in your earlier filed application serial No. 52,923, with the drawings in your application which resulted in patent, and I ask you, do you find a figure in the drawing of serial No. 52,923 that corresponds to Fig. 1 of serial No. 182,884; that is, Patent No. 2,210,846?

Mr. Ely: Wait a minute. What is this question? Off the record.

(Discussion off the record.)

A. Yes.

Q. Which one do you feel corresponds?

A. Fig. 1.

Q. There are differences?

A. And also Fig. 4.

Q. Just take one thing at a time.

A. Yes.

Q. I ask you, do you find the stucture shown in Fig. 1 of your Patent 2,210,846 illustrated in your earlier application 52,923?

A. In principle, yes.

(Dep. 35):

Q. I didn't ask you in principle. I asked you in structure.

A. These are not photographically the same structures.

Q. I understand what you are driving at, Mr. Aghnides, and that can be brought out by your attorneys. They are very capable men. They will bring that out, but that wasn't my question.

My question was, do you find the structure shown in Fig. 1 of your patent illustrated in serial No. 52,923?.

A. You mean photographically the same? What do you mean, the structure, or operatively the same?

Q. I mean structurally. Let me call your attention to something.

You show in Fig. 1 of your patent a diaphragm 16 and a downstream diaphragm or screen 20, just the two of those; correct?

A. Yes.

Q. Do you find anything in here which shows a single diaphragm above the air inlets—when I say "in here," I am referring to serial No. 52,923—and a single screen below the air inlets?

A. No. I find—

(Dep. 36):

Q. Well—

Mr. Ely: Let him finish.

Mr. Lettvin: We will go through that. We will pick that up. I want to take this logically.

Q. Is your answer you don't find that structure?

A. I don't find a picture with one screen, but I find the equivalent thereof.

Q. Do you find anything in Patent 2,210,846 which corresponds structurally, not functionally but structurally, to the illustration in Fig. 2 of your patent application, serial No. 52,923?

A. Did you say structurally?

Q. Structurally but not functionally.

A. Structurally, no.

Q. The same question with respect to Fig 3 of your application 52,923; is that structure, forgetting function, found in your application which resulted in your Patent 2,210,846?

A. No, I do not see that construction.

Q. And the same question with respect to Fig 4 of your application, serial No. 52,923?

A. Same reply.

Q. No?

A. Right, no.

(Dep. 37):

Q. And the same question with respect to Fig. 5 of your application, serial No. 52,923?

A. I do find that Fig. 4 corresponds to—Fig. 4 of my patent corresponds to Fig. 5.

Q. Are you speaking structurally or functionally?

A. Structurally, too. I have here a diaphragm and I have two screens. So it does.

Q. With respect to Fig 6 of your earlier application, serial No. 52,923?

A. There isn't any.

Q. There is nothing in the patent corresponding; right?

A. That's right.

Q. With respect to Fig. 7, is there anything in the patent corresponding to Fig. 7 of your serial No. 52,923?

A. No, there is not.

Q. Is there anything in your patent corresponding to the Fig. 8 of your serial No. 52,923?

A. Yes. We have Fig. 8 in both cases.

Q. Those are identical?

A. Yes.

Q. And with respect to Fig. 9 of your 52,923, is that identical with Fig. 9 of your patent?

(Dep. 38):

A. Yes, it seems so.

Mr. Lettvin: I identify the file wrapper of Patent No. 2,210,846 as Defendant's Exhibit 2.

(File wrapper of Patent No. 2,210,846 marked Defendant's Exhibit 2 for identification.)

Q. Let us return to your application, serial No. 52,923, Defendant's Exhibit 1 for identification.

Is the structure shown in Fig. 2 the equivalent of the structure shown in Fig. 1 functionally?

A. In this same application?

Q. In that application, yes.

A. In principle, yes.

Q. Is the structure shown in Fig. 3 the equivalent of Fig. 1 in operation?

A. It would give a similar result. As I told you, I did not build Fig. 3.

Q. Is it directed toward obtaining the same results?

A. Yes.

Q. And you would figure that the principles of operation of Fig. 3 and Fig. 1 were the same; is that correct?

A. I would think so.

Q. Is that true with respect to a comparison of Fig.

(Dep. 39):

1 and Fig. 4?

A. That is also in principle the same because there is one restricted orifice and two screens below and air vents on the side.

Q. What about Fig. 5 and Fig. 1?

A. The same.

Q. And the same is true with respect to Fig. 7 and Fig. 1?

A. Fig. 7 I never built.

Q. I am talking about the principle of operation.

A. Yes.

Q. And the same is true with respect to Fig. 8 and Fig. 1?

A. No. Fig. 8 is not the same thing as Fig. 1.

Q. I didn't ask you whether it was the same thing. I asked you did they operate the same.

A. No.

Q. Just comparing Fig. 1 and Fig. 2, is there anything that is shown in Fig. 1 from a standpoint of structure or function which brings about a different result than that which you would obtain from Fig. 2?

Mr. Ely: Pardon me.

Mr. Lettvin: Read that question again.

(Dep. 40):

(Question read.)

Q. I am referring to your application serial No. 52,923.

A. In principle the operation is the same, though the efficiency may differ.

Q. But is there anything that would bring about that change in efficiency?

A. What do you mean? I don't understand your question.

Q. You said the efficiency may differ.

A. Yes.

Q. What is shown in Fig. 1 that may change that efficiency?

A. Fig. 1 is shown to have one orifice in the diaphragm and two screens—Fig. 2, I mean. Fig. 2 is shown to have one orifice in the diaphragm and two screens.

Q. And?

A. And Fig. 1 is shown to have a plurality of orifices in the diaphragm with two screens.

Q. So, then, the difference in efficiency would result from the variation between the single orifice in the diaphragm in Fig. 2 as contrasted with the multiplicity of orifices in the diaphragm in Fig. 1; is that right? (Dep. 41).

A. No, sir.

Q. Then would you explain?

A. No, because when you have a very limited supply of water, in other words, very low pressure, you can afford to put only—you cannot afford but one orifice to give enough velocity to the stream. Then you would have a perfectly good aerator with one orifice and sufficient screens below. But when you have high water pressure, then you have enough velocity in each stream by adopting a diaphragm with a plurality of holes.

Q. The same question with respect to Fig. 3 and Fig. 1 in comparison; is there anything there that you find in Fig. 1 of serial No. 52,923 that would vary the operation as compared with the operation of Fig. 3?

A. I told you that I did not build Fig. 3.

Q. I understand that. You didn't build Fig. 2, either. I am asking you on the principle of operation.

A. The principle is the same.

Q. And the same is true with respect to Fig. 4 and Fig. 1, a comparison thereof?

(Dep. 42):

A. Fig. 4 and Fig. 2, they fall in the same category.

Q. I am asking you to compare Fig. 4 to Fig. 1.

A. I have to repeat everything I said with respect to Fig. 2. One can repeat everything.

Mr. Lettvin: Off the record.

(Discussion off the record.)

A. What I said with respect to Fig. 2 in respect to Fig. 1 applies also to Fig. 4 in respect to Fig. 1, because Fig. 4 shows one orifice in the diaphragm and two screens which are now shown in the drawing below, like Fig 2 showing one orifice in the diaphragm and two screens which are not shown in the drawing.

Q. And your answer is also true with respect to the comparison of Fig. 3 and Fig. 1; is that correct?

A. As I told you, having not built Fig. 1 I would think it is the same.

Mr. Ely: Not Fig. 1.

A. Having not built Fig. 3, I would say it operates in the same way.

Q. What is the purpose of the stack of three nozzles, converging nozzles, in Fig. 3, for the purpose of inducting

(Dep. 43):

more air?

A. It is like putting on the wall of the aerator, instead of one row of holes, you can put two rows of holes. So it is exactly the same as the aerator I am building where you might put a second row of holes below.

Q. Air holes, you mean?

A. Air holes.

Q. Now, comparing Fig. 5 and Fig. 1 of your application, serial No. 52,923, would you say the same is true?

A. They are the equivalent, yes.

Q. And the same with respect to a comparison of Fig. 7 with Fig. 1?

A. Fig. 7 also, like Fig. 2, has one orifice in the diaphragm and is supposed to have two screens below, which are not shown in the drawing.

Q. But the mode of operation and the principle of operation is the same; is that correct?

A. Yes. I must make a remark about 34 in Fig. 7, which indicates a flexible hose, which has not been used. It has never been used.

Q. I understood you to say that devices were constructed in accordance with the Belgian Patent No. 406,702; is that (Dep. 44):
correct?

A. Devices?

Q. Commercial devices were constructed?

A. Yes.

Q. In accordance with Fig. 1?

A. Fig. 1.

Q. Where were those devices sold?

A. They were sold in Belgium.

Q. Were there any improvements or modifications on the device that was made in Belgium? Were there any improvements included?

A. Which improvements are you referring to?

Q. Well, was the device in Belgium made strictly in accordance with Fig. 1?

A. Yes, strictly in accordance with Fig. 1.

Q. Do they still manufacture it that way?

A. No.

Q. When did they change?

A. We have a model of the Belgian aerator on Exhibit 19.

Q. When did they change the manufacture of Exhibit 19?

A. It is a big order. I don't know. That was made before I came to America in 1937, I suppose.

(Dep. 45):

Q. You came to America in 1937 for the purpose—

A. Or maybe a little later.

Q. Was it made before you came to America in 1937 or later?

A. I don't remember that, but I certainly brought it with me in 1939, you see.

Q. That you brought in 1939?

A. Yes.

Mr. Ely: That you brought in 1939. You had better say what you are talking about.

The Witness: Exhibit 19.

Mr. Lettvin: He is talking about what is identified as Exhibit 19, the aerator at the end of Exhibit 19.

Q. That was made in Europe, you say?

A. In Europe, Yes.

Q. I just want to go back on that one question and ask you again, because you are indefinite about it, when were changes made in the device that was being manufactured in Belgium, to the best of your recollection? Take your time.

A. What kind of change? We made them smaller and smaller, which didn't change the principle.

Q. When you say "smaller and smaller," you mean

(Dep. 46):

smaller and smaller in height?

A. Yes. In other words, we made it more economic, shorter, all these things.

Q. That isn't my question. You said that the devices that were first manufactured in Belgium were made in substantially strict accordance with what is shown in Fig. 1 of your Belgian patent; is that right?

A. That's correct.

Q. And now you say that they then started to make modifications?

A. I started to make in metal, which were naturally smaller, for the faucet aerators.

Q. Was this original one in rubber?

A. This is a rubber connector. This is metal. So it was put together.

Q. You started to make changes?

A. Yes, I started to make in metal for screwing on to the faucet.

Q. Did they start to manufacture them that way?

A. Yes. That's what I brought you. That came a year or two later than this one.

Q. When was this metal screwed on to a connector first made by you, do you recall?

A. First made? The first tests I made, I made them (Dep. 47):

in metal and screwed them on to the faucet, but the first commercially produced ones were with a top connector in rubber and they were sold at Brussells University exhibition in 1935, where a medal and diploma of honor was given as the outstanding novelty or invention of the exhibition. That is so. I have an official letter.

Q. Here is what I want to know: When did this form of the invention or when did this form of your device first become produced by your Belgian manufacturer as shown in Plaintiff's Exhibit 19 of the Chicago lawsuit?

A. I would think, since I have to refer purely to my memory—it is 20 years ago, about—that metal-made aerators screwed on to the faucet were first applied to faucets in Belgium in 1936 or 1937. I don't remember.

Q. Was it of this type as shown on Plaintiff's Exhibit 19?

A. Yes, of this type. I mean the outer appearance, at least.

Q. What about the inside appearance?

A. The inside appearance, we put the screens in a casing to make it easy to clean and all these things.

(Dep. 48):

Q. Did it have the same number of screens as presently in your Plaintiff's Exhibit 19?

A. Yes, it had the screens.

Q. When you came to the United States in 1937, whom did you speak to concerning license agreements—Acushnet?

A. Yes.

Q. And also Chicago Faucet?

A. Chicago Faucet Company, and also Republic Brass in Cleveland.

Q. And how many of those organizations took licenses?

A. All three took licenses.

Q. Republic did, too?

A. Yes.

Q. You didn't produce a copy of the Republic license, did you?

A. That was cancelled a year after they took a license and I don't even have a copy. It was before the war.

Mr. Ely: We couldn't find it.

Q. You couldn't find it?

A. No.

Q. You don't have a copy of the Republic license?

(Dep. 49):

A. No; but it was practically an exact copy of the Chicago license, of which you will have a copy, the letter.

Q. When you came to this country, did you have some models of these devices that were being manufactured in Belgium?

A. Yes, I brought my Belgian aerator. I also brought the French made aerator. I brought an English made aerator, and that's how I demonstrated to the interested parties my aerator.

Q. And did you bring them plans and specifications, too, as to how to build these aerators?

A. No.

Q. Did you ever supply plans and specifications to your original three licensees, Acushnet or Republic or Chicago Faucet Company?

A. I don't remember having supplied blueprints.

Q. How did they know how to make this?

A. They had the patent and they had also the Belgian samples.

Q. But your patent in the United States did not issue until 1943.

A. I gave them drawings.

Q. You did give them drawings?

(Dep. 50):

A. Yes, sir.

Q. That is what I asked you.

A. Well, drawings. Pardon me. Drawings of my patent application.

Q. My mistake.

A. And also the European samples.

May I continue?

Q. Yes.

A. And what they built here by themselves does not correspond in size or design neither to the European samples I produced nor to the patent drawings.

So they made their own aerators.

Q. When did Achusnet first begin to make their devices in this country?

A. Well, their contract was signed in 1937. I suppose they started in 1938.

Q. Don't you have any records as to when they started?

A. When you sign a contract you start applying the clauses of the contract. It was at the end of 1937, so I believe they started in 1938, because they diligently proceeded with the contract.

Q. They did diligently proceed with the contract?

A. Yes.

(Dep. 51):

Q. Was the device that they made substantially in accordance with Plaintiff's Exhibit 14 of the Chicago lawsuit?

A. Is that what you are holding in your hand?

Q. Yes.

A. No, the first ones were slightly different. The second patent, which is restricted orifice, was not incorporated, and this connecting part, which is a different invention of mine, was also made in a different way. It looked in appearance the same, but the connecting part was made in two pieces and I found some way of making it in one piece and I sent them samples. So they changed their molds.

Q. When did you do that? When did you find a way to make it in one piece?

A. The connecting part I found a way to make in one piece in Europe.

Q. When?

A. Possibly 1938, 1939. 1938, I suppose.

Q. Go ahead. And when did your improvement of the —orifice, did you say?

A. Of the second patent below?

Q. Yes. When did you incorporate that?

A. That I suppose was incorporated sometime in 1938,

(Dep. 52):

maybe the beginning of 1939.

Q. When did you develope that concept?

A. Oh, sometime in 1938, I believe.

Q. And when did they start manufacturing them with that orifice?

A. Maybe towards the end of 1938 or in 1939 sometime, I suppose. I would say in 1939, not before, because it took time to make molds.

Q. Was the orifice necessary to make the Acushnet device work better?

A. It makes the contour of the stream, the jet, somehow softer. It evens off the pressure. The faucets are being opened and closed in all floors, in all homes, and there is a constant variation of water pressure in the pipes, and the restriction above the diaphragm has some beneficial effect.

Q. And when did you first have that concept?

A. That concept I had, I remember it was after the Brussels exhibit, the Brussels University exhibition. I suppose I first got it around 1936, 1937, I don't remember exactly.

Q. Did you incorporate it in your devices?

A. Then, no.

Q. When did you first incorporate them in your devices?

(Dep. 53):

A. I believe sometime in 1938, in Europe, and maybe towards 1939 in this country.

Q. Did you file any application in Europe on that development?

A. No, because I came in 1939 here and I filed here. The first application was here.

Q. Is that the application that resulted in your Patent No. 2,316,832?

A. Correct.

Q. Did you file any foreign applications corresponding to your U. S. application which resulted in your Patent 2,316,832?

A. My Swiss licensees applied for a structure with those two disks like this, and then after the war I made applications in foreign countries as to this and other constructions.

Q. What country?

A. Important European countries: England, France, Belgium, Germany, Italy, I suppose.

Q. I understand that this model identified as Plaintiff's Exhibit 19 in the Chicago lawsuit was demonstrated in the Patent Office; is that correct?

A. That's right.

(Dep. 54):

Q. I also notice that the aerator mechanism which screws off the adapter is of a greater outer diameter than the connection of the adapter to the hose; is that correct?

A. I don't know what you mean.

Mr. Lettvin: Would you read that question to him.

(Question read.)

A. Right. Being a female thread, it has got to be of a larger diameter than the spout to which it is screwed.

Q. Does that smaller adapter contribute to the operation of your aerator?

A. In this sample you are indicating to me, it was not intended to make a smaller adapter for the purpose you are referring to. It is merely to be able to push into a hose of a regular dimension.

Q. But that wasn't exactly my question as to what your purpose was in making it this way. I am not interested in your purpose. I just wanted to know whether the small size of the adapter contributed to the operation of your aerator.

A. In this case, as the aerator you are holding in your hand has a second perforated disk, it would not make any (Dep. 55):

noticeable difference.

Q. Would it make a difference if there was only one perforated disk?

A. Then it would make a difference when the upper part of the aerator has a restricted orifice. When the portion of the aerator upstream the diaphragm is restricted, that would have a certain pressure distributing effect.

Q. Well, did it in this case? I understand that you tested it before the Patent Office—

A. Yes.

Q. —both with one disk and with two perforated disks; is that correct?

A. That's right.

Q. Then did it have an effect when you tested it with only the single perforated disk?

A. It may have had some effect.

Q. What would your theory tell you, because you are a theoretician on this; did it have an effect or didn't it have an effect?

A. It could have an effect if it was especially built for that purpose, because the restriction in that case is way up. The pipe itself has a restriction. I did not build a restriction any smaller than the pipe itself, so if it comes

(Dep. 56):

through a pipe with a very restricted orifice, naturally that in itself would have an effect.

Q. You mean to say your adapter here is not smaller than the rubber tube which is fitted over it?

A. That's what I say, yes, sir. I may add, at least it was not intended to be. We measured it up.

• • •

(Dep. 57):

It is stipulated and agreed by and between the parties that Defendant's Exhibit 3 is exempletive in the upper figure thereof of a portion of Plaintiff's Exhibit 19 which was used in the Chicago lawsuit, and that the lower figure thereof is illustrative of the cross section of Plaintiff's Exhibit 17 in the Chicago lawsuit.

Is that all right?

Mr. Ely: Yes.

• • •

(Dep. 60):

Q. This was not fully gone into, and I am referring to Plaintiff's Exhibit 19 in the Chicago lawsuit. I would like to ask you this question: It is true that this aerator at the end of Plaintiff's Exhibit 19 of the Chicago lawsuit has two perforated disks—

A. Yes.

Q. —above the air holes; is that correct?

A. Right.

Q. And how was that tested before the Patent Office? How did you demonstrate this model before the Patent Office

A. I demonstrated it with and without upper perforated disks.

Q. That is, with one perforated disk and with two?

A. And with two perforated disks, that's right.

(Dep. 61):

Q. And when you tested it with one perforated disk and you tested it with the two perforated disks, was the result any different.

A. There was no difference in character. It was a little smoother.

Q. It was a difference in degree?

A. Well, not in degree of aeration, but it was a difference in the smoothness.

Q. In degree of smoothness?

A. In degree of smoothness. The pressure was not jumping irregularly from one point to the other.

Q. You brought suit on your Patent No. 2,210,846 against Goodrie and Wrightway Engineering Company in Chicago; is that correct?

A. Right.

Q. You did not charge Goodrie and Wrightway with infringement of your Patent 2,316,832; is that correct?

A. Correct.

Q. Your Patent No. 2,210,846 was declared invalid in the district court; is that correct?

A. Correct, in Chicago.

Q. And it was declared invalid in the Court of Appeals; is that correct?

A. That's correct.

(Dep. 62):

Q. And upon petition for rehearing the Court of Appeals refused to hear the case; is that correct?

A. Correct.

Q. And you filed a petition for writ of certiorari to the Supreme Court of the United States and that was denied; is that correct?

A. Correct.

Q. And then you filed a motion with Judge Minton of the U. S. Supreme Court requesting that the time within which to file for rehearing on the petition for writ of certiorari before the Supreme Court of the United States be extended; is that correct?

A. That's right.

Q. And that was denied; correct?

A. I believe so.

Q. And that latter motion to Judge Minton was predicated in part upon the decision that you hoped or expected to receive in the pending instant case; is that correct?

A. I believe so.

END OF VOLUME 1 OF 2 VOLUMES.

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IN THE

UNITED STATES COURT OF APPEALS

FOR THE FOURTH CIRCUIT

No. 7,294

S. H. KRESS & COMPANY,

Appellant,

vs.

ELIE P. AGHNIDES and CHASE BRASS & COPPER COMPANY, INC.,

Appellees.

Appeal from the United States District Court for the Middle District of North Carolina, Greensboro, North Carolina.

Appendix to Appellant's Brief

Volume 2

(EXHIBITS)

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IN THE

UNITED STATES COURT OF APPEALS

FOR THE FOURTH CIRCUIT

No. 7,294

S. H. KRESS & COMPANY,

Appellant,

vs.

ELIE P. AGHNIDES and CHASE BRASS & COPPER COMPANY, INC.,

Appellees.

Appeal from the United States District Court for the Middle District of North Carolina, Greensboro, North Carolina.

Appendix to Appellant's Brief

Volume 2

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Plaintiff's Exhibit 11

2 App. 1

Aug. 6, 1940.

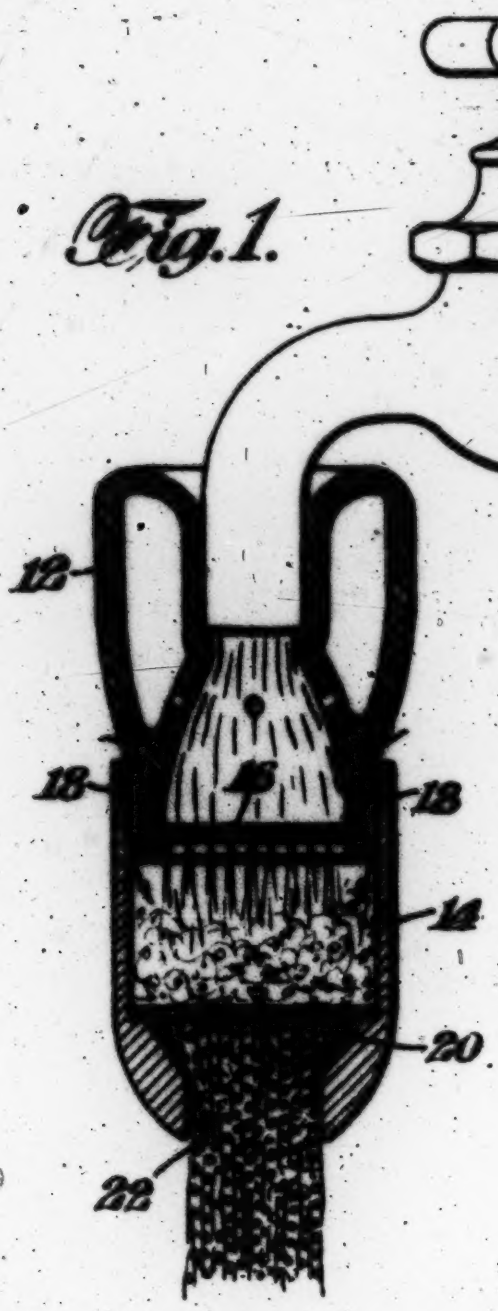
E. AGHNIDES

2,210,846

FLUID MIXING DEVICE

Filed Dec. 31, 1937

Fig. 1.



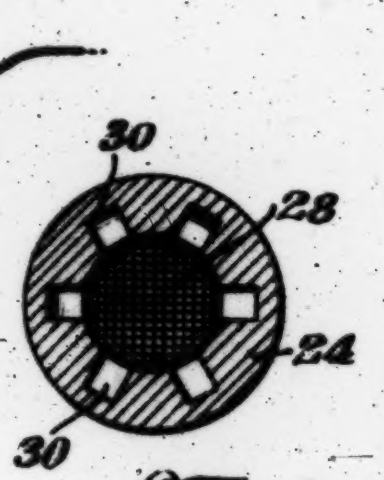


Fig. 3.

Fig. 4.

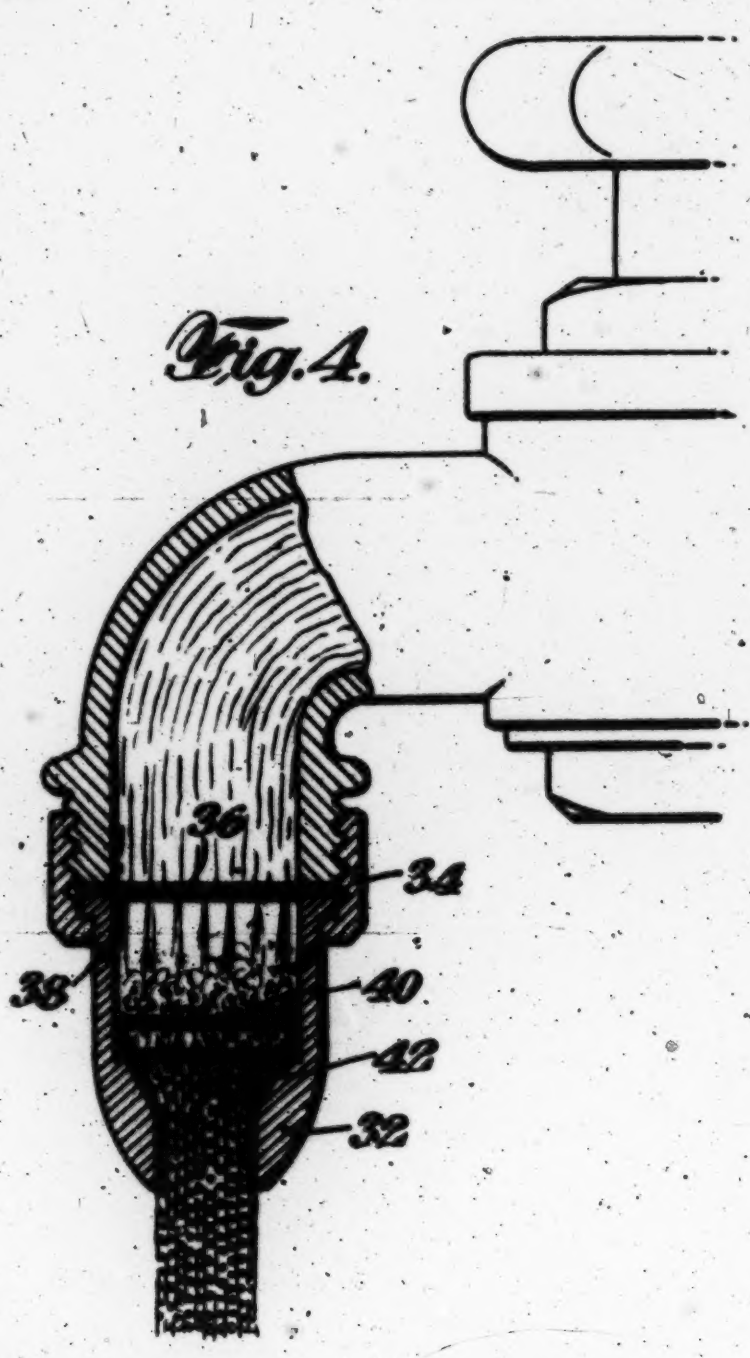


Fig. 8.

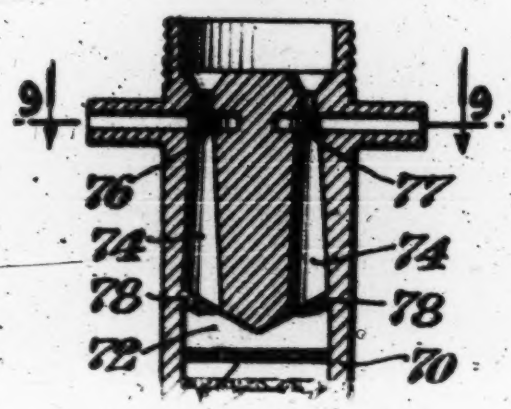


Fig. 2.

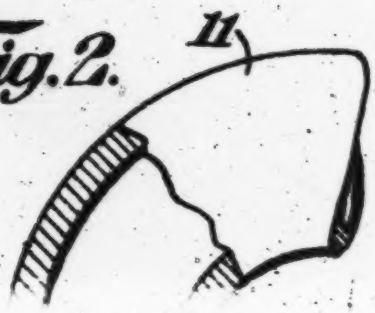


Fig. 5.

Plaintiff's Exhibit 11 (p. 2 App. 2 is blank)

2 App. 43

Patented Aug. 6, 1940

2,210,846

UNITED STATES PATENT OFFICE

2,210,846

FLUID MIXING DEVICE

Elie Aghnides, New York, N. Y.

Application December 31, 1937, Serial No. 182,884
In Belgium December 8, 1934

5 Claims. (Cl. 261—76)

This invention relates to a device for intimately mixing a gas with a liquid, and ordinarily is employed for aerating water. This application is a continuation in part of my earlier application Serial No. 32,923, filed December 4, 1936.

Broadly speaking, my invention consists of a device intended to be connected to a source of liquid under pressure, such as an ordinary water tap, and includes a chamber provided with one or more apertures through which the water is forced into the chamber with substantial velocity and as a result the liquid stream has very substantial kinetic energy. Proper openings are provided leading into the chamber from the outside air so that the flow of water will draw air into the chamber according to the well-known Venturi principle. In accordance with my invention, means are provided in the path of the stream of water after it leaves the aperture or apertures and before it discharges at the outlet end for finely breaking up the water and offering sufficient resistance for thoroughly mixing it with air. An outlet for the chamber is provided from which the water mixed with air can emerge. It is advisable to have the outlet of smaller cross section than the cross section of the chamber so that the water will flow in a coherent stream; but the outlet should be of sufficient size relative to the aperture or apertures through which the water is introduced into the chamber so that the water mixed with air will emerge at a substantially lower velocity than the water entering the chamber. Of course, when I refer to the outlet forming a coherent stream, I do not mean to imply that the outlet cannot be divided into several such streams, if desired.

The essential feature of my invention is an arrangement of a dividing means in the path of the liquid emerging from the aperture or apertures delivering liquid to the aforesaid chamber, this dividing means being adapted to finely break up the fluids and to imprison in the liquid, air particles forming therein such small bubbles that they remain in suspension in the jet.

In the devices suggested until now, the air drawn in by the liquid separates immediately at the outlet of the apparatus and no known apparatus has for its object, as is the case with my invention, the formation of a coherent "white" jet, this being due to the fine division of the air and to the formation of a true suspension of a multitude of air bubbles in the water.

In the preferred embodiment of my invention, the water is introduced into the mixing chamber through a plurality of apertures. Also I find that a highly efficient form of dividing means is a fine screen located at the outlet, and I have found that even better results can be obtained if two or more superposed screens are used in the outlet discharge. The size of the mesh employed is not critical but I have obtained good results where the holes in the screen measured about .6 square millimeter.

Such a screen finely breaks up the water and offers sufficient resistance for thoroughly mixing it with air. On the other hand, the resistance of the screen is low enough to permit passage of the air in the form of bubbles disseminated in the water. The streamlets of aerated water are sufficiently close together, so that on leaving, they join each other to form a single jet.

My invention can readily be understood by reference to the accompanying drawing, in which Fig. 1 is a sectional view of a device embodying my invention which is shown as attached to an ordinary water faucet through the medium of a connecting device such as is described in my Patent No. 2,071,780; Fig. 2 is a sectional view of a device adapted to be screwed onto an ordinary water pipe; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a sectional view showing a further modified form; Figs. 5, 6, 7 and 8 are additional sectional views showing further modifications; and Fig. 9 is a section on line 9—9 of Fig. 8.

Referring now to Fig. 1, 10 designates an ordinary faucet or tap. 12 is a tap connector, the operation of which is described in detail in my patent above referred to. 14 is the casing of the mixing device enclosing the primary mixing chamber. The perforated screen 16 admits the water into the casing 14 in the form of a plurality of jets. A plurality of air ports 18 are provided for admission of air into the interior of the casing 14. 20 is a screen at the lower part of the casing, and below the screen 20 the casing narrows to form a passage 22.

When the water is turned through this device, if the faucet is opened only slightly, so that very little kinetic energy is developed in the water, as it emerges from the perforations in the screen 16, in proportion to the resistance of the screen 20, then the water will come out of the discharge 22 without air bubbles. On the other hand, as the faucet is opened wider, the velocity of the water emerging from the perforations in the screen 16, increases and acquires the necessary kinetic energy relative to the resistance of the screen 20, to effect entrainment and mixing of the air with the water.

While the total cross sectional area of the per-

forations in the screen 16, under the usual conditions of operation, is such as to force the water into the chamber with substantial velocity and the screen 20 has the proper relative resistance thereto, to effect the desired result, it is obvious that any change in the cross sectional area of the perforations in the screen 16 will require a change in the resistance of the screen, to establish the proportion necessary for the maintenance of substantially the same result. This water, again contacting with the screen 20, will pass through the screen with the air and emerge from the outlet 22. As the diameter of outlet 22 is substantially greater than the aggregate diameter of the perforations in screen 16, the water will have relatively low velocity as it comes out from the discharge.

When my device is functioning, the water, due to the thorough admixture of air, has characteristics which are surprisingly different from those of water as ordinarily discharged from a faucet. For example, if one's hand is put in the course of the water, the water will flow evenly and uniformly over the surface and will wet the entire surface without splashing. Also it will be found that if the discharge from such faucet is allowed to flow into a weak soap solution, it will make an extraordinary amount of foam, which will be found very useful for washing; for instance, when washing clothes or dishes. Again it will be found that the introduction of the air into the water will raise its dissolved oxygen content and the aeration tends to remove objectionable odors and gases from the water, rendering it more palatable. These effects are apparently due to the extreme thoroughness with which the aeration takes place in my device and the results are quite different from the results obtained by ordinary injection devices in which the air is not thoroughly broken up so that when the two fluids leave the apparatus, the air quickly separates from the water jet.

In the form of device shown in Fig. 2, a metal casing 24 is screwed directly onto the faucet 11. This casing holds the screen 20 against the mouth of the faucet and the casing is provided with an outlet screen 26. A series of ports 30 are provided in the casing to admit air in a manner similar to that already described in connection with Fig. 1.

In Fig. 4 the casing 32 is provided with a union coupling 34 for connection to an ordinary hose bib. The screen 20 is clamped between the casing 32 and the mouth of the hose bib. Air is admitted to the interior of the casing by a series of horizontal perforations 38. In this case two screens are provided at the outlet as indicated at 40 and 42, which will cause the air bubbles in the water to be somewhat smaller than where only a single screen is employed.

Fig. 5 illustrates a case where a single aperture is employed for admitting fluid to the chamber. In this figure, the casing 44 is screwed to the faucet 46 and clamps in place a plate 48 having a single aperture in the middle. A plate 50 supported by legs 52 is positioned in the lower part of the chamber and below this is positioned a screen 54. The water from the aperture in plate 48 strikes plate 50 and due to its kinetic energy the stream is broken up and thoroughly mixed with the air.

In Fig. 6 the plate 56 has a plurality of holes near the periphery and the casing 58 is formed with inwardly extending projections as indicated at 60. The principal part of the water coming through the openings in the plate 56 will strike these projections and be broken up as previously described. In this case, a screen 62 is also used in the device.

An effect similar to that shown in Fig. 6 is illustrated in Fig. 7 except that instead of having a plurality of apertures in the plate, the plate 64 has a single central orifice shaped to throw the water outwardly. The casing 66 again has projections as indicated at 68 similar to the projections 60 described above.

Another form of my device is shown in Figs. 8 and 9. In this arrangement it is possible to mix three fluids, one of which is under pressure. Leading into a mixing chamber 72 are a plurality of passages 74 to permit entrance of a fluid under pressure into the mixing chamber 72 enclosed by casing 78. The inlet port 76 intersects and leads into one group of passages 74 near the upper end of the passages; and another inlet port 77 likewise intersects and leads into another group of passages 74. The inlet ports 76 and 77 do not connect with one another; in consequence the channels 74 are grouped into two sections, each section being connected to an inlet port. In this form of my device each inlet port may admit a different fluid into the mixing chamber. The cross-sectional area of passages 74 is greater after intersection by inlet ports 76 and 77 and the cross-sectional area of the passages continues to increase as the passages approach the mixing chamber. As in preceding examples, the fluid under pressure courses through passages 74 and draws fluids from inlet ports 76 and 77 into the enlarged portion of passages 74. Baffles 78 project into the passages at the point where the passages discharge into the mixing chamber. The baffles in part interrupt the course of the fluids in each passage and thereby serve to effect a preliminary mixing of the fluids. Within the mixing chamber two screens 80 in spaced relation are placed across the path of the fluids emerging from the passages 74 to interrupt abruptly the course of all such fluids and thereby cause the fluids to mix and sub-divide into minute particles. The fluids are discharged through the outlet 82.

While I have referred to perforated upstream plates and downstream screens, it is possible to use perforated plates or (except in certain forms) screens in either position. In the various forms of device shown, the screens and the plates forming the apertures are made readily removable so that the devices can easily be claimed.

What I claim is:

1. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

2. A device for producting a coherent jet of water containing air bubbles, comprising a cham-

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ber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and means for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

3. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet, the resistance offered by the said means and the cross sectional area of the orifice being proportioned to effect the entrainment and mixing of the air with water before their discharge from the said outlet end.

4. The device of claim 1 in which the said means comprises a screen at the discharge end of the chamber, the openings in which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

5. The device of claim 1 in which the said means comprises superposed screens, the screen at the discharge end of the chamber having apertures which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

ELIE AGHNIDES.

Plaintiff's Exhibit 12 (p. 2 App. 6 in Plane)

April 20, 1943. E. AGHNIDES 2,316,832

FLUID MIXING DEVICE

Filed April 5, 1940

FIG. 1.

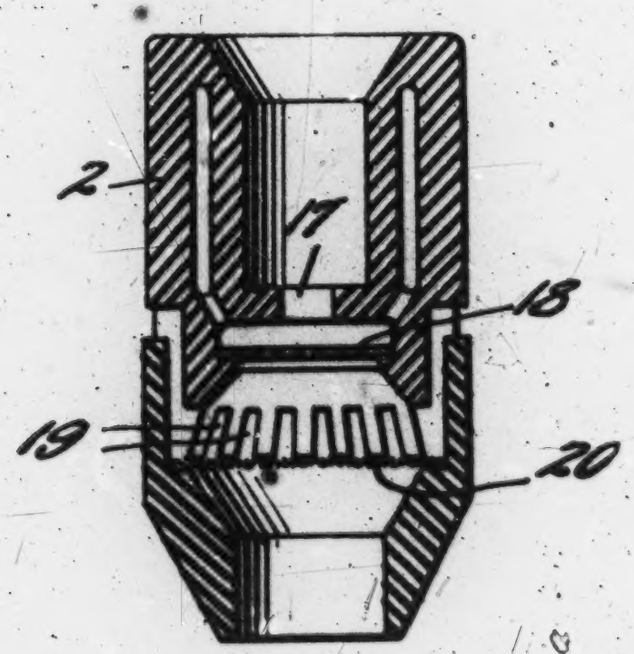


FIG. 2.

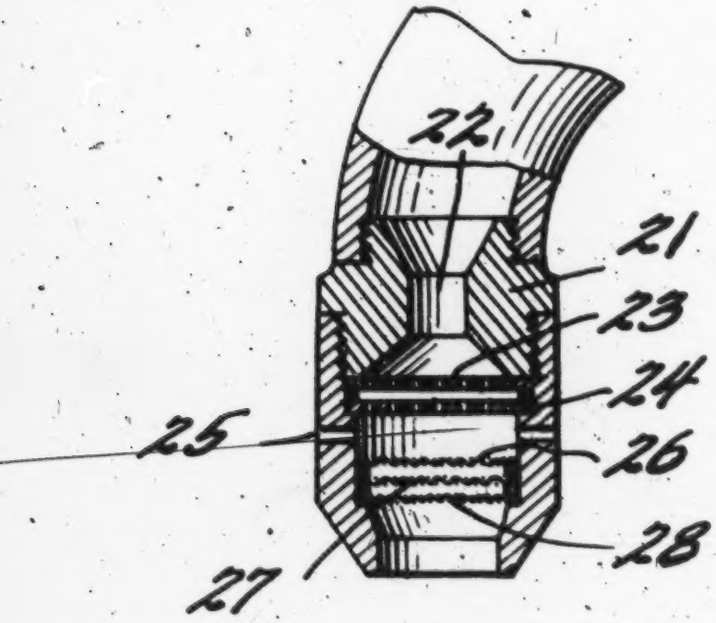
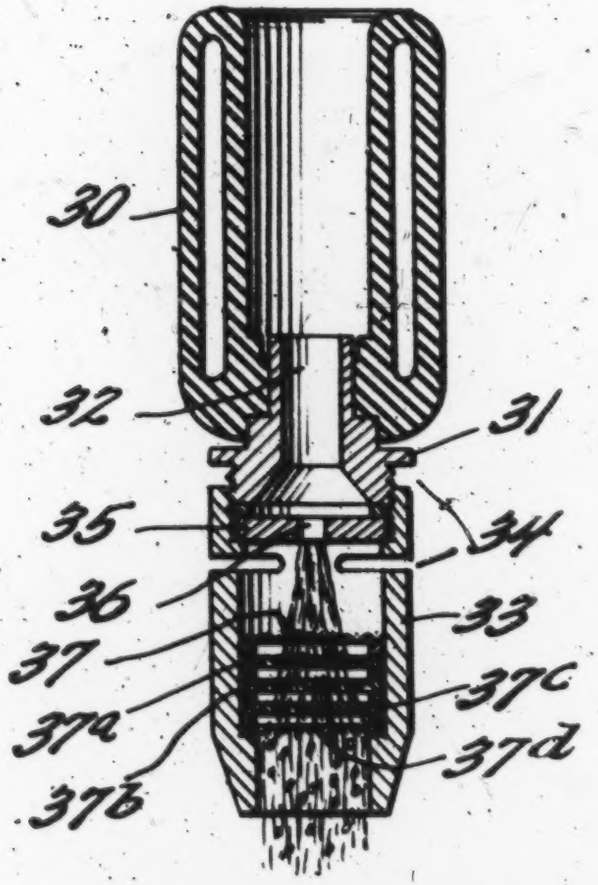


FIG. 3.



Inventor

Elie Aghnides,

By John Boyle Jr.

Attorney

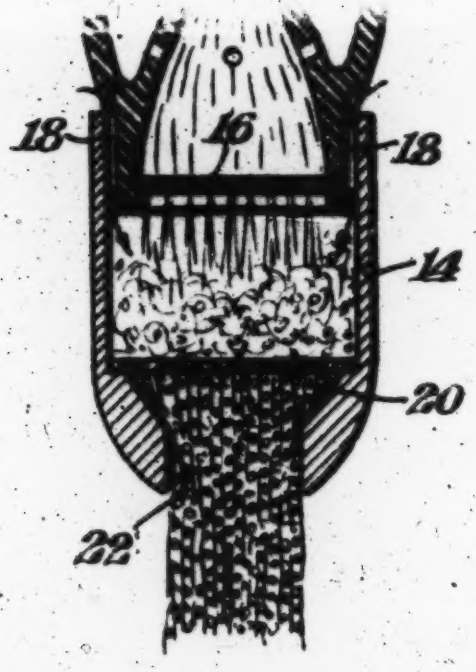
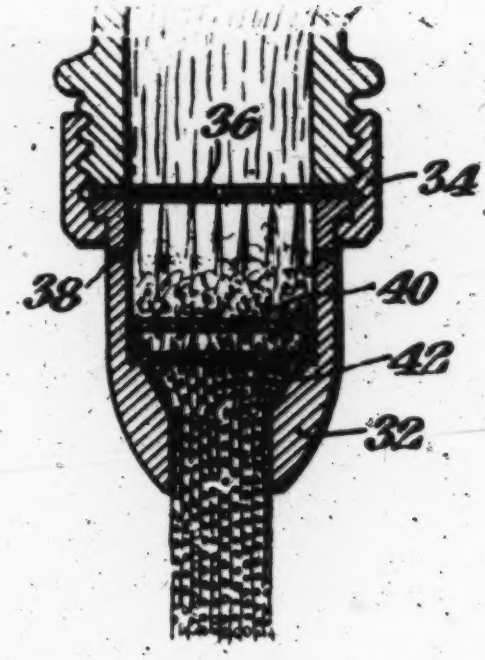


Fig. 3.



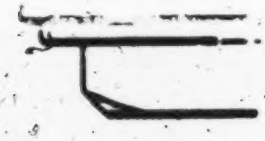


Fig. 8.

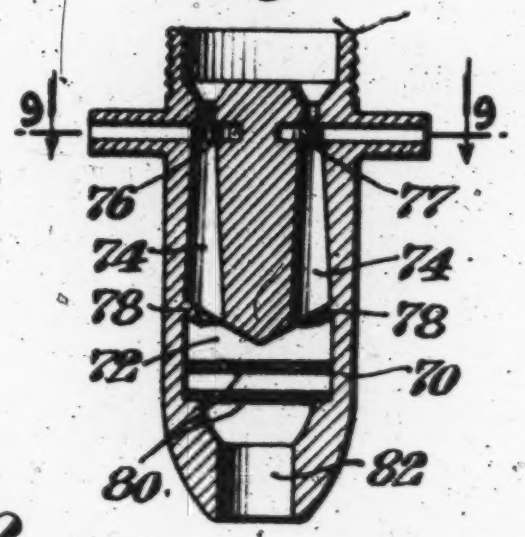


Fig. 2.

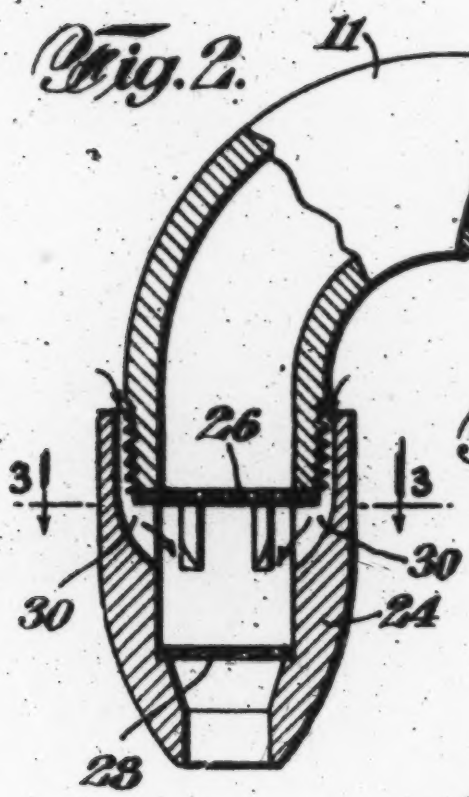


Fig. 2.

Fig. 9.

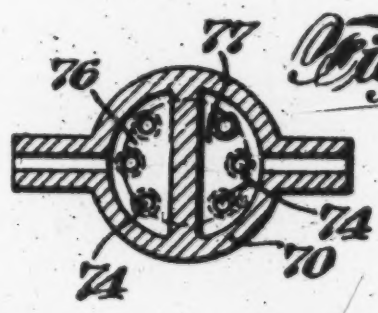
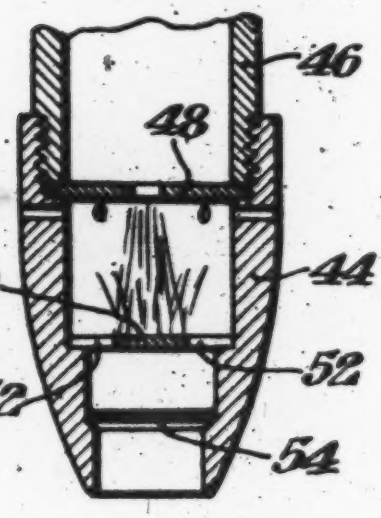


Fig. 5.



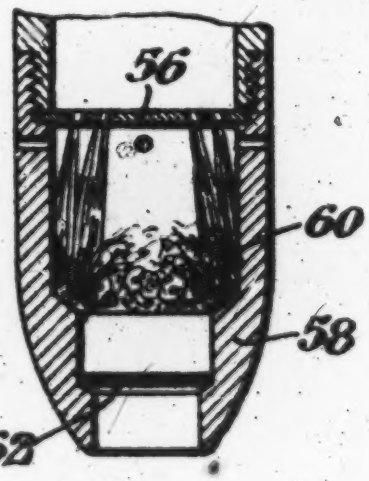


Fig. 6.

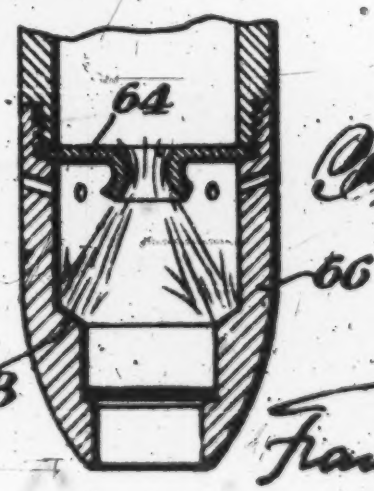


Fig. 7.

INVENTOR,
Elie Aghnides,
BY
Frank S. Ackerman,
ATTORNEY.

Plaintiff's Exhibit 12

(2 App. 8 is Blank)

2 App. 9

UNITED STATES PATENT OFFICE

2,316,832

FLUID MIXING DEVICE

Elie Aghnides, New York, N. Y.

Application April 5, 1940, Serial No. 328,126
In Belgium December 4, 1934

4 Claims. (Cl. 261—76)

My invention relates to a device for intimately mixing a large volume of a gas, such as air, with a liquid such as water, and ordinarily is used for producing a jet of water containing air bubbles disseminated throughout the jet and is an improvement on my Patent 2,210,846 granted Aug. 6, 1940. Such a jet is whitish in appearance, soft and light to the touch and possesses numerous advantages not found in the ordinary water jet as discharged from a faucet.

Generally speaking, my invention consists therefore of a device comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube, such as an ordinary household water faucet, containing water under the normal main pressure of about 3 atmospheres. The outlet end of the device is adapted to discharge a coherent jet containing air bubbles disseminated throughout the jet. At the upstream end of the chamber is an apertured diaphragm through which the stream of water is adapted to be forced into the chamber with substantial velocity. An air port opening into the chamber is provided through which air is induced by the stream of water. At least one foraminous screen is provided in the path of the stream of water after it leaves the apertured diaphragm and before it discharges at the outlet end, for finely breaking up the stream of water which is thoroughly mixed with the air.

Means are provided for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet. This may be in part, a multiplicity of orifices in the upstream diaphragm; or in the addition of at least a second foraminous screen between the first screen and the outlet end, with openings so close to each other that the issuing aerated water unites to form a coherent jet; or, in the addition of a tubular portion at the outlet end and adapted to contract the stream of aerated water issuing from the screen, to form a coherent jet.

Referring to the drawing

Fig. 1 is a vertical section of one form of my invention.

Figs. 2 and 3 are similar sections of modified forms.

In Fig. 1, I employ the same type of rubber tap connector 2 as in Fig. 1 of my aforesaid patent, except that I provide a constricted orifice 17, above the upstream apertured diaphragm 18, and the air inlets 19 terminate close to the surface of the downstream screen 20.

In Fig. 2, I employ a screw coupling 21 having a restricted orifice 22 for connecting my device to a faucet and I employ two spaced apertured diaphragms 23, 24 located above the air inlets 25 and I use three spaced screens 26, 27, 28, in the downstream end of the device.

In Fig. 3, I employ the same general type of rubber tap connector 30 as in Fig. 1. The metal coupling 31 having a restricted orifice 32 is secured thereto. Screwed to the coupling is the lower portion 33, provided with air inlets 34, an upstream diaphragm 35 having a single orifice 36 and five spaced wire screens 37, 37*a*, 37*b*, 37*c*, and 37*d*. The number of screens used depends on the orifice area, the distance between the diaphragm and screens and the mesh of the wire screens.

I have found that when the water is discharged through a restricted orifice, as at 17, Fig. 1, at 22 Fig. 2, and at 32 Fig. 6 that the flow through the orifices in the upstream diaphragm is improved and a more regular and softer jet is delivered from the outlet end of the device.

A similar result is obtained when instead of the restricted orifice upstream of the diaphragm, a second foraminous diaphragm as 23, Fig. 2, preferably with greater aggregate cross section of the foramina, is located upstream of the first diaphragm 24, at a distance of about 1 mm. Both the restricted orifice and the second diaphragm can be used together for a more uniform flow of the bubbly jet.

This application is a continuation in part of my applications Ser. No. 182,884 filed Dec. 31, 1937 patented August 6, 1940, Number 2,210,846 and Ser. No. 52,923 filed Dec. 4, 1935.

I claim:

1. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a foraminous member upstream the apertured diaphragm.

2. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the

Plaintiff's Exhibit 12

outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice upstream the apertured diaphragm.

3. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice and foraminous member upstream the apertured diaphragm.

4. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, superposed apertured diaphragms at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragms and means in the path of the stream of water after it leaves the apertured diaphragms and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles.

ELIE AGHNIDES.

Plaintiff's Exhibit 13 2 App. 11

Ministère de l'Industrie,
des Classes Moyennes et du Commerce
Intérieur

Direction Générale de l'Industrie

SERVICE
DE LA PROPRIÉTÉ INDUSTRIELLE

N° 406.702

ROYAUME DE BELGIQUE

3041 Ex 13

BREVET D'INVENTION

Le Ministre des Affaires Économiques
~~Le Ministre de l'Industrie, des Classes Moyennes et du Commerce Intérieur,~~

Vu la loi du 24 mai 1854 ;

Vu le procès-verbal dressé le 8 décembre 1934, à 11 h 50',

au Greffe du Gouvernement provincial du Brabant ;

ARRÊTÉ :

Article 1er — *Il est délivré à* Mr E. Aghnidis,
16, rue Capouillet, à Bruxelles,
repr. par Mrs Jeunehomme & Delbrouck, à Bruxelles

Article 1er — *Il est délivré à* Mr E. Aghnidis,
16, rue Capouillet, à Bruxelles,
repr. par Mrs Jeunehomme & Delbrouck, à Bruxelles

un brevet d'invention pour : Dispositif pour mélanger de l'air à une colonne de fluide sous pression en circulation.

Article 2. — *Ce brevet lui est délivré sans examen préalable, à ses risques et périls, sans garantie soit de la réalité, de la nouveauté ou du mérite de l'invention, soit de l'exactitude de la description, et sans préjudice du droit des tiers.*

Au présent arrêté demeurera joint un des doubles de la spécification de l'invention (mémoire descriptif et dessins) signés par l'intéressé et déposés à l'appui de sa demande de brevet.

Bruxelles, le 31 janvier 1935.

Pour le Ministre et par délégation :
Le Directeur, Chef de Service,
[illegible]
LE DIRECTEUR GÉNÉRAL

Plaintiff's Exhibit 13

2

Fig. 1

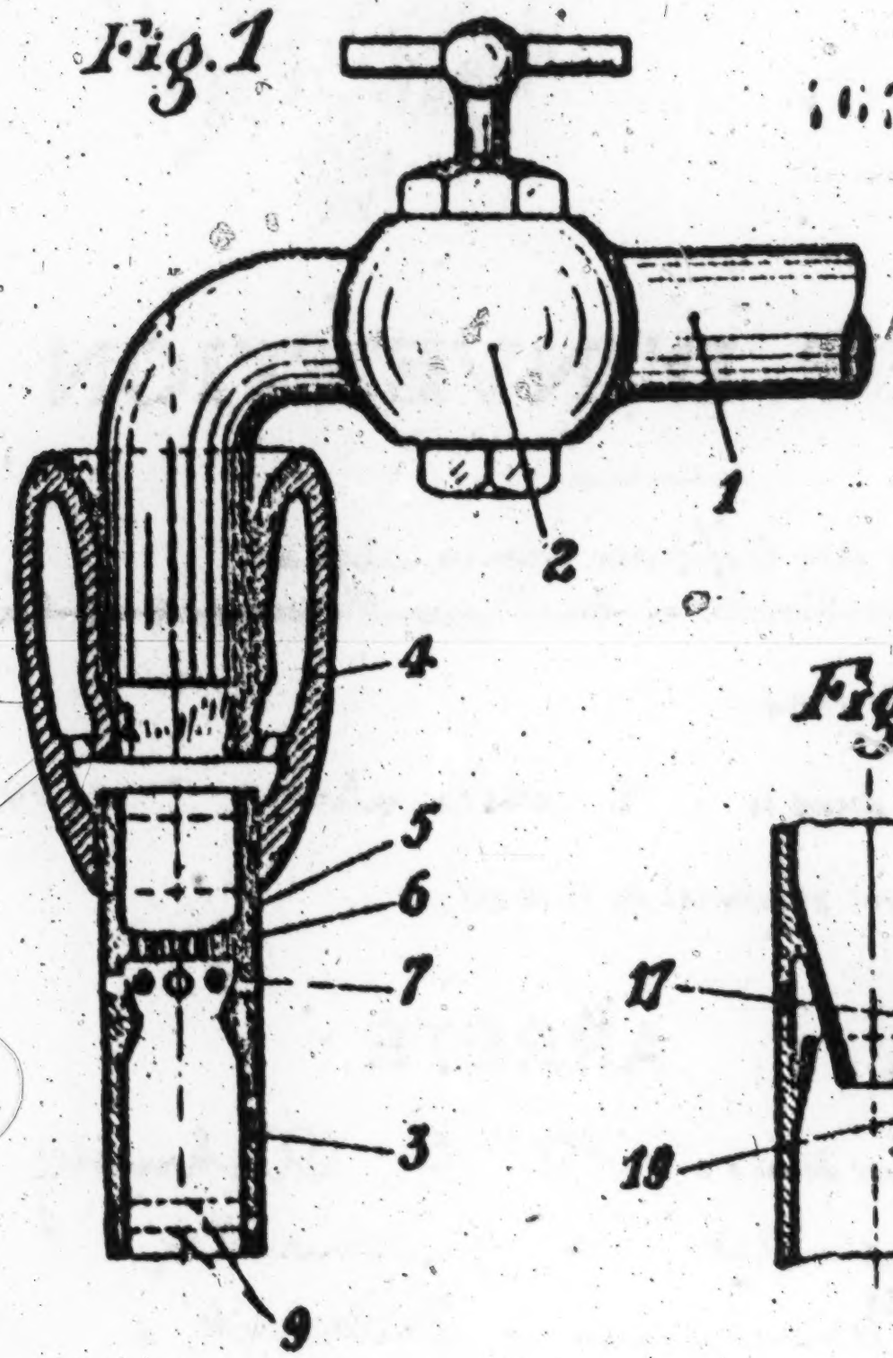
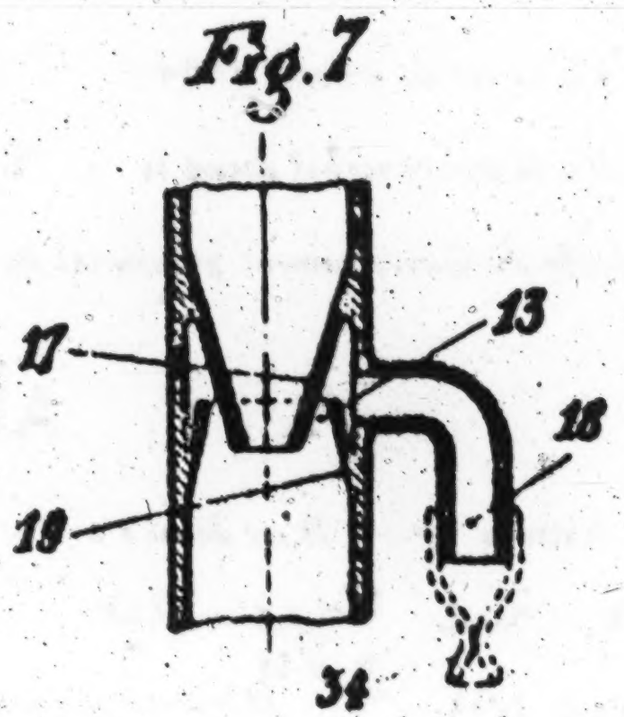


Fig. 7



This process can be realized in different ways and permits for certain applications such as the water softening installations, and noticeable simplification of said installations.

In a non-limitative series or examples, the drawings represent:

Figure 1, axial section of a device of water aerator in a domestic conduit.

Figure 2 to 5, several schematic realizations of variants.

Figure 6 is a schematic view of an installation (domestic or other) for the treatment of fluids, for instance, water softening; and

Figure 7 is an enlarged view of the aerator of Figure 6.

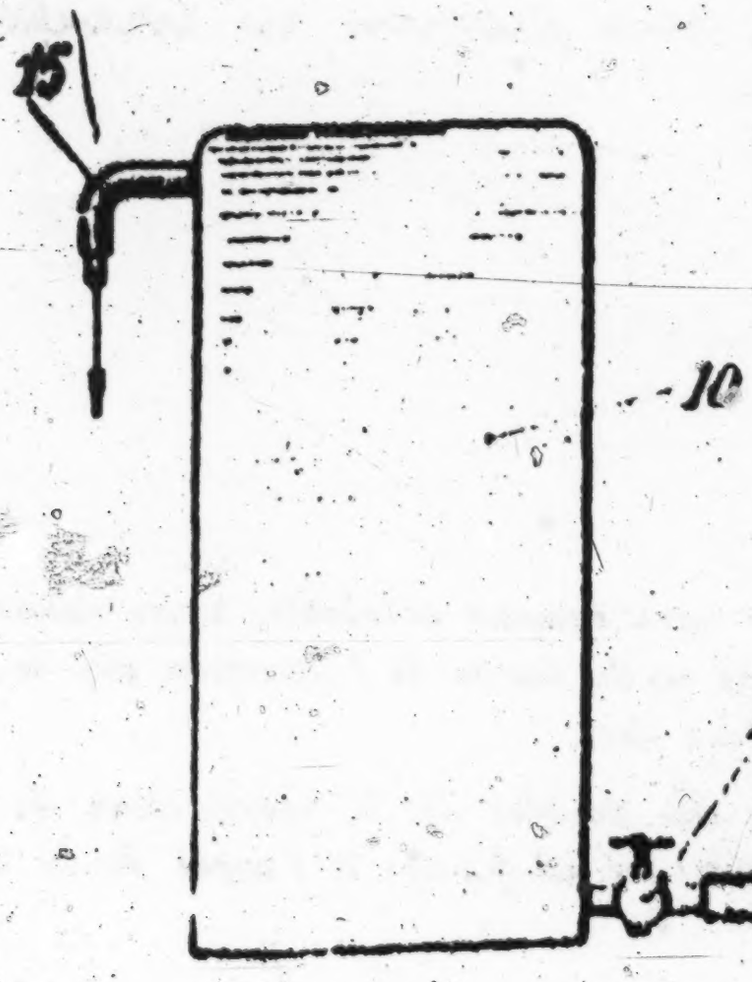
Figure 8 is a variant of Figure 6.

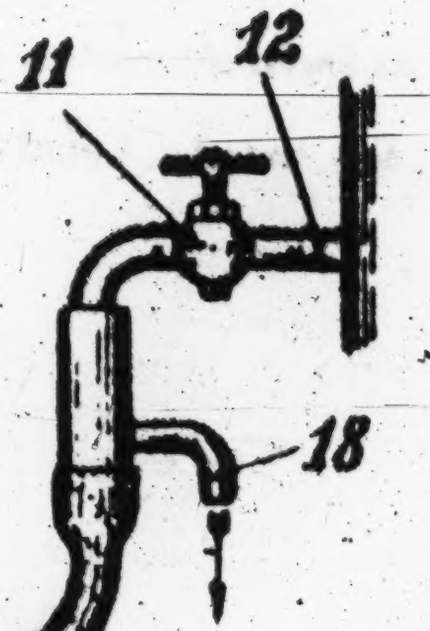
In Figure 1, 1 is a pipe of water under pressure, for instance, and 2 is a faucet of any type. At the spout end of the faucet is attached a tubular member 3; the assembly can be done in any manner providing it is watertight, and in the example shown it is realized by a special tap connector 4 known as self-locking. The tubular member is closed inside by a transversal wall 5 pierced with holes 6, the purpose of which is to divide the water under pressure in order to increase the surface of contact between the water and the air; the total cross section of the holes 6 is smaller than the total cross section of the spout and of the faucet. Downstream the wall 5, the lateral wall of the tube 3 is pierced with a crown of holes 7, the diameter of said crown being necessarily bigger than the diameter of the total cross section of holes 6. The function is easily understood. 9 designates schematically two sieves or dividers of any type with a view to create one or more chambers and insure the homogeneousness of the mixture before it is discharged.

3

The wall 5 can offer a total section of flow equal to that of the conduit downstream (Figure 5). Likewise, the holes 7 can be replaced by a complete interruption of the tubular wall, as shown in Figures 2 to 5. In Figure 2 the conduit downstream 20, larger than the conduit upstream, terminates opposite to it by a convergant-divergant part 21. In Figure 3, it is multiple and comprises several crowns at different levels for the admission of air; in Figure 4 which corresponds to Figure 3, the two conduits the one upstream and the other downstream, are united by a collar 23 permitting the passage of air.

Fig.6





Note

Pages 13–14 not present; no other copy of Record is available

In Figures 6 and 7, 10 designates a known apparatus which is intended to soften the water traversing said apparatus; such a type of water softener is of course well known. The use of these water softeners is expanding more and more in the domestic economy; they are connected simply to the spout end of the faucet 11 of the conduit 12 carrying hard water. Up to now, however, these installations had a shortcoming; the connection between the softening reservoir 10 and the faucet 11 is made by a flexible rubber hose 14 and between said flexible hose and the faucet 11 one has to insert a faucet with three outlets, the handling of which permits the water coming from 11 or the water coming through the water softener and discharging through 15, or deviated by the faucet with three outlets, for being used as such without softening. These faucets with three outlets are relatively expensive to make and are not always watertight; moreover, they move too often the rubber top connectors during the operation.

4 According to the invention, the faucet with three outlets is done away with and replaced by a simple faucet 16 directly mounted on the water softener 10. To the faucet 11 the device shown by Figure 7 is attached and corresponds to that of Figure 1, with the difference that the slots or crown of holes are formed in a circular chamber by a pipe 18. In Figure 7, the wall 5 is eliminated, as a variant; the converging conduit 17 opens in the diverging conduit 19 which is connected with a flexible hose 14 which itself is connected to the faucet 16. Between the two conduits 17-19, exists a free crown 13 communicating with the end 18 for the admission of the air aspired by the column of liquid.

When the two faucets 11 and 16 are opened, the water passes through the reservoir 10 where said water arrives charged with air; the faucet 16 being closed, the water is discharged through 18 hard as it is.

For the same application, one can provide the device of Figure 8 which permits not only to send aerated fluid towards the water softener 10, but also to obtain directly aerated water when the faucet 16 is closed. In this arrangement of Figure 8, in which the rubber connector 25 is mounted directly at the spout 10 of the faucet 11, the pipe carrying the water under pressure 26, opens in the chamber 27 which is open, on the one hand on the

pipe 28 and closed, on the other hand on the pipe 29. The first pipe is intended to receive the flexible hose 14, and is provided with a wall 30 perforated (corresponding to the wall 5 of figure 1) and holes 31 for the admission of air which open on the pipe 29. This latter is inside in a convergent-divergent conical form, with a crown of holes 32 for the admission of air at the place where the cones meet. The diverging part of this pipe is provided with dividers 33.

The two faucets 11 and 16 open, the liquid tends to pass through the conduit of lesser resistance, therefore through the conduit 14; as a result a strong suction is created in 29, the air passing through the holes 32 and from there through the holes 31. If the faucet 11 alone is open, the liquid flows through 31 to 29, entraining air through the holes 32.

In the device of Figure 6, one can provide, at the end 18, a tube 34 in very soft rubber, and which is mounted at this end, for special reasons, it is not desirable that the fluid passing through 10 be mixed with air; thanks to the vacuum created in 18 by the flow of the fluid toward 14, the flexible hose closes automatically. It is understood that the examples given here are not limitative and have for purpose to show the application of the process in general; everything that has been shown for the conduits of water applies to conduits of fluid under pressure in circulation, continuous or intermittant.

CLAIMS.

1. A device for mixing air to a column of liquid under pressure in circulation, comprising in combination an air port in the column and the means downstream of said air-port for obliging the air entrained to mix with the fluid under pressure, the section of the conduit at the point of said air duct and the section of the conduit immediately downstream of said air duct being larger than the total free section immediately upstream.

2. A device according to claim 1 characterized in that said means is formed by one or more baffles located in the downstream part of the device.

3. A device according to claim 1 characterized in that said means is formed by a prolongation of the downstream part of the device.

4. A device according to claim 1. characterized in that the column of fluid is divided, immediately upstream said air duct, for instance, by a perforated transversal partition.

5. For a device according to claim 1, a connector provided with an air port, an upstream end adapted to be connected to a pipe of fluid under pressure, a downstream end provided with means for effecting the mixture of the fluid under pressure and of the air entrained, the section of said connector at the point where is the air port and the section of the part immediately downstream being larger than the section of the part immediately upstream.

6. A device according to claim 5, characterized by the fact that it comprises many air ports at different levels.

7. A device of a connector according to claim 5, characterized in that the air port is formed by a pipe.

8. A device of claim 7, characterized in that said pipe is adapted to be closed automatically by the depression created in the connector during the flow of liquid under pressure.

7 9. A device according to claim 7 characterized in that said pipe is provided also with an air port, with parts upstream and downstream, according to claim 5.

10. An installation of the treatment of fluid under pressure in circulation, comprising an apparatus for said treatment provided with a faucet at the entrance or at the outlet, said apparatus being connected at the entrance, to a device according to claim 7 or 8 or 9 so that by closing said faucet fluid not treated will flow through the pipe of said connector, said apparatus forming at the same time a means for mixing the air entrained and the fluid under pressure according to claim 1.

11. An installation according to claim 10 characterized in that the apparatus for treatment is a water softener or a filter or a sterilizer, connected by a connector according to claim 7, 8 or 9, to a faucet, of the fluid under pressure, which permits, by the handling of the faucet, of the water softener, to obtain water simply aerated by the pipe of the connector, or to let the water flow, aerated or not, by this apparatus.

PLAINTIFF'S EXHIBIT NO. 15 2 App. 19

NUMBER (Series of 1935)

52923

DIV. 3932

PATENT NO.

1935 DATED

(EX'R'S BOOK)

Name ELIE AGHNIDES

of BRUSSELS

~~State of~~ BELGIUM

Invention FLUID MIXING DEVICES IN WHICH ONE OF THE FLUIDS IS UNDER PRESSURE

ORIGINAL

APPLICATION FILED COMPLETE DEC 4 , 1935

IF APPLICATION FILED

Petition, Specification, Oath, First Fee $30, 1 sheets Drawings; DEC 4 1935

RENEWED

This application referred to in Patent No. 2,210,846. Do not destroy. (See order No. 3166, 400 O.G. 1)

ORIGINAL

RENEWED

APPLICATION FILED COMPLETE DEC 4 , 1935

PARTS OF APPLICATION FILED

Petition, Specification,
Oath, First Fee $30,
1 sheets Drawings,

DEC 4 1935

This application referred to in Patent No. 2,210,846.
Do not destroy. (See order No. 3166, 400 O.G. 1)

DO NOT DETACH

Examined and passed for Issue , 193

Exr. Div.

Notice of Allowance , 193
By Commissioner.

Final Fee , 193

Reexam'd and passed for Issue , 193

Exr. Div.

Notice of Allowance , 193
By Commissioner.

Final Fee , 193

Division of App., No.

Attorney FRANK S. APPLEMAN 1331 G ST N W CITY.

Associate Attorney

No. of Claims Allowed *Print Claims* *in O.G. Class*

Title as allowed

BELGIUM DEC 8 1934

1

Etats-Unis De L'Amerique Du Nord
Ver. Staaten Von N. Amerika
(Division XXXII U. S. Patent Office Dec 12 1935)

PETITION.

U. S. Patent Office Dec. 12 1935 Division XXXII.

To the Commissioner Of Patents

Your Petitioner Elie Aghnides, a citizen of the Greek Republic, and resident of Brussels, Belgium, whose post-office address is: 54, rue Capouillet, Brussels, Belgium, prays that Letters Patent may be granted to him for the Improvements in Fluid mixing devices in which one of the fluids is under pressure. set forth in the annexed Specification, and he hereby appoints Frank S. Appleman, 1331 G. Street, N. W. Washington, D. C. his Attorney with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to receive the Patent, and to transact all business in the Patent Office connected therewith.

Signed at Brussels, Belgium, Nov. 23, 1935.

Inventor Elie Aghnides

2 TO ALL WHOM IT MAY CONCERN:

Be it known that I, Elie Aghnides, a citizen of the Greek Republic and resident of Brussels, Belgium, have invented certain new and useful Improvements in Fluid mixing devices in which one of the fluids is under pressure, of which the following is a specification:

This invention relates to a device for intimately mixing at least two fluids one of which is under pressure.

According to a general *embodiment of the invention*, ~~but not limiting case~~, atmospheric or surrounding air is intimately mixed *with* to a circulating water column under pressure to *form at true water and air emulsion* ~~obtain~~ at the outlet of the device; ~~a true water and air emulsion~~. The mixture thus obtained possesses remarkable qualities: the water thus charged with oxygen and carbon dioxide from the air, acquires an agreeable flavour, like water coming from a natural spring; (this water is more *digestible* ~~digestive~~, it softens the skin and due to the simultaneous and automatic introduction of *emulsified air* ~~emulsed air~~ and water *and forms* ~~realises with soap~~ a very foamy emulsion *with soap* which means

better washing and a *real* ~~serious~~ economy of soap and time, for instance when washing clothes. The enriching of the water in oxygen and carbon dioxide, *gives* ~~confers to~~ the water a higher exodizing power and *causes* ~~realises~~ an ionisation of the water which renders it more active.

Another *practical* ~~pratical~~ application *of the invention occurs,* ~~consists~~ for instance, in drawing off beer. Repeated experiments have proved that beer drawn off by means of carbon dioxide under pressure and ~~compelled to~~ run through the device *of* ~~according to~~ the invention to be *thereby* intimately mixed with the surrounding air, acquires a better taste and a finer appearance, the foam being more *lasting* ~~resistant~~.

This invention *includes* ~~compsises~~ all the *instances* ~~cases~~ in which one or more fluids (gas or liquid) have to be mixed to a circulating liquid column under pressure.

3 The device according to the invention comprises essentially, in combination, a cylindrical hollow body part which can be adapted to a fluid pipe under pressure, a passage in the wall of said body for entrance of another fluid in said body, by the aspiration caused by the passage of the fluid under pressure, *through the device* and *of* means below said passage, to force the fluid drawn in to mix with the fluid under pressure; *The* ~~the~~ cross section of said body at said passage and the *cross* section immediately below said passage being larger than the total free section through which the fluid flows immediately above said passage.

According to an embodiment for mixing the surrounding air to a column of liquid under pressure, the passage or passages for the entrance of air may be formed by a ring of holes or slits in the walls of the tube or by an interruption in the wall, either with the part above said passage *being contracted at its lower end,* ~~which contracts itself~~ and *extending into* ~~eventually enters in~~ the part below, or *from* with the part below *being widened at the top to receive the lower end of the part above* ~~provided with a widening at the entrance~~ or ~~still~~ with the part above *being* of a smaller diameter than the part below said passage *and extending therein.*

The passage of the fluid under pressure, either at normal speed or at an artificially increased speed, creates a suction *and draws* air through said slits or holes *which*

~~and this air~~ is drawn away by and mixed to the fluid under pressure in the pipe below said passage, ~~provided to that end, with~~ *by means of* one or several dividing devices or baffles *provided for this purpose.*

This process can be carried into effect in various manners and *by various means* ~~in certain cases or applications~~ such as water softening devices *wherein it acts to* ~~it contributes to considerably~~ simplify the plant *considerably.*

In the drawings:

Fig. ~~Fig.~~ 1 is a *vertical and* axial cross-section of a water aerating device for a domestic water pipe.

Figs. ~~figs.~~ 2 to 5 *inclusive are vertical axial sections of modifications of the aerating device of Fig. 1,* ~~relate to various diagrammatic realizations.~~

Fig. 6 is a diagrammatic view of a domestic or other plant for treating fluids, for instance for water softening.

4 *F*~~f~~ig. 7 is a ~~cross section~~ *vertical axial section on* at an enlarged scale, of the aerating device shown in *F*~~f~~igure 6.

F~~f~~ig. 8 is a *an axial vertical section of a further modification* ~~cross section through a modified form~~ adapted to mix three fluids and

F~~f~~ig. 9 is a transversal cross section along line IX-IX of *F*~~f~~igure 8.

In *F*~~f~~igure 1, the numeral 1 indicates ~~for instance~~ a water pipe under pressure and 2 a tap of any type whatever. A tubular part 3 is fixed at the end of the tap; the connection can be made in any desired manner provided that it is tight, and in the example *shown comprise* ~~this is realized by means of~~ a special self tightening fitting 4 of a known kind.

The tubular part 3 is provided *with* ~~and closed inside by means of~~ *an internal transverse* ~~a transversal partition~~ 5 provided with holes 6 the object of which is to divide the current of water to increase *air* contacting surface *thereof. The* ~~between the water and the air, the~~ total section or surface of the holes is smaller than the section through which the fluid flows at the end of the tap. *Below* ~~Above~~ the partition 5, ~~in respect to the current of water,~~ the side wall of the tube 3 is provided with a ring of holes 7, the diameter of *the total section of said holes 7*

of said ring being necessarily larger than the diameter of the total section of *said* holes 6.

~~The manner in which the device works will be immediately understood.~~

Numeral 9 represents diagrammatically two perforated plates *or* ~~of~~ any other dividing devices, to *form* ~~realize~~ one or several chambers or spaces *to insure* ~~ensuring~~ uniformity in the mixture before its exit.

The partition 5 may have a *diameter* ~~total section of passage~~ equal to that of the pipe below (*Fig.* 5). ~~in respect to the current of water. In the same way, the~~ *The* holes 7 may be replaced by a complete interruption of the tubular wall as is the case in *Figures* 2 to 5. *inclusive.*

In *Figure* 2, the *lower* ~~upper~~ pipe 20, which is larger than the pipe *20a above* ~~below,~~ comes to an end in front of the latter in the form of a contracting-expanding *air venture* part 21. In *Figure* 3, the device ~~is manifold and~~ comprises several stepped *and funnel mouthed* air admission rings, ~~and in figure~~ *Figure* 4 ~~which corresponds to figure 3, the piping above and the piping below are jointed by a slip or by means of flanges 23 allowing the air to pass.~~

The device shown *Figure Fig* 8 and 9 is adapted to mix three fluids, only one of which is under pressure. This device can be absolutely identical to the devices shown in *any of* the first named figures provided that *at least one hole corresponding to* ~~of one part of~~ *one of* holes 7 *of Fig. 1 is connected* ~~is in relation~~ with a tank or container *containing* ~~comprising~~ one fluid, and the other *corresponding holes are connected* ~~part in relation~~ with another container *containing* ~~comprising~~ another fluid. *T*hose two fluids will be sucked up at the same time by the fluid column under pressure and will *be mixed* ~~mix~~ with it, *by* ~~thanks to~~ the dividing *wall* ~~rift~~ 9.

In the example shown, however, the wall of the body 3^a is provided with two diametrically opposed ducts 35-36, ~~each of which is connected with a container or space~~ (not shown) containing a fluid to be mixed to the fluid under pressure. *Each* ~~In each~~ duct opens in the interior of the body 3^a *through* ~~a port 7'~~ in the wall of the latter.

~~On a certain~~ *The upper* part of ~~its length~~, the body 3^a, is ~~of~~ solid ~~nature,~~ *and is provided with* ~~through~~ this solid

part, longitudinal holes 37 of expanding cross-section *in a downward direction* ~~are pierced~~, in order to divide the fluid under pressure into a number of streams which exert a suction through *the ducts 25 and 31A* ~~ports 7'~~, a diametrical partition 38 is also provided at the level where the ducts 35-36 open *into* ~~in~~ the body 3^a, and at this point, the body 3^a, ~~is flowed~~, in order to form two separate compartments 39-40 at each side of this partition 38. Thus, fluid under pressure passing through said chambers aspirates fluid from each duct 35-36, the fluid under pressure is mixed with one other fluid at one side and fluid under pressure is mixed with the third fluid at the other side., *Both* ~~both~~ mixtures are completed *by vertical* ~~through~~ baffles 41 at the bottom of holes 37 and are then mixed together in the lower part of the body 3^a, where one or more baffles or perforated plates 9^a are also provided.

In that respect, the device shown *in F*igure 3 would also *be capable* ~~allow~~ *of mixing* ~~to mix~~ more than two fluids, by connection of each circular superposed passage 7 to a fluid container ~~or space~~.

When the device discharges into the open air *F*igures 1 to 5 and 8-9) the invention also provides at the *lower ends of the ports 3, 3a, 20, 50, 60, and 70, a* ~~end of port 3 a~~ narrow portion 42 to prevent splashing and to enhance the effect of the dividing *wall* ~~sift~~ 9.

Referring to *F*igures 6 and 7, 10 is an apparatus or tank of a known kind for softening the water which flows through it. This softening device can of course be of any desired type.

The use of those devices is becoming more and more *general* diffused in domestic life. They are simply connected at the end of a distributing tap 11, of the non-softened water pipe 12.

Previously, however, ~~these plants had a drawback:~~ the connection between softening tank 10 and service tap 11 was provided with a flexible rubber tube 14 and between said tube and tap 11 it is necessary to insert a three-way cock or tap, through which water coming from 11 was either sent through the softening device to come out at 15 or diverted through the three-way cock to be used without any softening.

Those three way cocks are of relatively costly manufacture and are not always tight. ~~Moreover they cause movements of the rubber connection.~~

According to the invention, the three-way cock is done away with and replaced by a simple tap 16 directly fixed on the softening device 10.

The device shown *F*igure 7 is connected to tap 11. Said device corresponds *generally* to the device shown *F*igure 1, with the difference that the air *is admitted from an annular* ~~slits or holes are formed in a circular~~ chamber *B5* ~~ending up in~~ a nozzle 18 *formed thereon.*

In *F*igure 7, the partition 5 is *eliminated as in Figs. 2-4 inclusive* ~~done away with according to a modified form.~~

The converging *end 17 of the upper* ~~or contracting~~ 7 ~~pipe~~ 17*a*, opens out into a *reduced end 19 of a* diverging or expanding pipe 19*a* which is connected to the flexible pipe 14 *and* ~~itself connected~~ to tap 16.

Between the two pipes 17*a*-19*a* there remains *an annular space* ~~a free ring~~ 13 in communication with the *chamber 18a* and nozzle 18 to permit entrance of the air sucked in by the liquid column.

When the two taps 11 and 16 are open, the water flows through tank 10 where it arrives loaded with air. When tap 16 is shut, the water comes out at 18 in the non-softened state.

In the device shown *F*igure 6, a very flexible rubber tube *34* can be provided at the nozzle 18, said tube being fixed to said nozzle, when for special reasons, it not desirable that the fluid flowing through 10 should mix with air. *On account of* ~~Thanks to~~ the *suction* ~~vacuum~~ at 18, resulting from the passage of fluid towards 14, said flexible tube closes itself automatically (see *F*ig. 7).

Having now fully described my said invention, what I claim and desire to secure by letters patent, is:

1. A device for intimately mixing at least two fluids, one of which is under pressure, comprising in combination a hollow cylindrical body connected to a delivery-pipe of fluid *a* under pressure, a passage-way in the wall of said body *for the admission* ~~connected to a space containing~~ a fluid to be mixed to the fluid under pressure, and means down stream this passage, for obliging both fluids to mix together before leaving the hollow body, the cross-section *area* ~~area~~ of the body at the point where said passage is made, and the cross-section *area* ~~area~~ of the body immediately down stream this passage being both larger than the free streaming section for the fluid under pressure immediately up stream said passage.

2. A device for intimately mixing at least two fluids, one of which is under pressure, comprising in combination a hollow cylindrical body connectable to a delivery-pipe of fluid under pressure, means for dividing the stream of fluid under pressure; a passage-way down stream said means, in the wall of said body, connected to a space containing a fluid to be mixed to the fluid under pressure, and means down stream this passage, for obliging both fluids to mix together before leaving the hollow a body, the cross-section *area* ~~aera~~ of the body at the point where said passage is made, and the cross-section *area* ~~aera~~ of the body immediately down stream this passage being both larger than the free streaming section for the fluid under pressure immediately up stream said passage.

3. A device for intimately mixing at least two fluids, one of which is under pressure, comprising in combination a hollow cylindrical ~~body~~ connectable to a delivery-pipe of fluid under pressure, means for dividing the stream of fluid under pressure, a passage-way down stream said means, in the wall of said body, connected to a space containing a fluid to be mixed to the fluid under pressure, and means down stream this passage, for obliging both fluids to mix together before leaving the *a* hollow body, the cross-section *area* ~~aera~~ of the body at the point where said passage is made, and the cross-section *area* ~~aera~~ of the body immediately down stream this passage being both larger than the fre streaming section for the fluid under pressure immediately up stream said passage, (the means for obliging the fluids to mix together comprising at least two perforated plates up stream the escape opening of the hollow body, these plates being spaced from each other.)

4. A device for intimately mixing at least two fluids, one of which is under pressure, comprising in combination a hollow cylindrical body connectable to a devilery-pipe of fluid under pressure, means for dividing the stream of fluid under pressure, a passage-way down stream said means, in the wall of said body, connected to a space containing a fluid to be mixed to the fluid under pressure, and means down stream this passage, for obliging both fluids to mix together before leaving the hollow body, the cross-section *area* ~~aera~~ of the body at the point

where ~~said~~ passage is made, and the cross-section
9 *area* ~~aera~~ of the body immediately down stream this passage being both larger than the free streaming section for the fluid under pressure immediately up stream said passage, the means for obliging the fluids to mix together comprising at least two perforated plates up stream the escape opening of the hollow body, these plates being spaced from each other, and a resserrement in the interior of the hollow body down stream these perforated plates.

~~5. A device for intimately mixing fluids one of which~~ is under pressure, comprising, in combination, a hollow cylindrical body connectable to a delivery-pipe of fluid under pressure, *a* crown of holes in the wall of said body *for the admission of* ~~connected to a space containing~~ a fluid to be mixed to the fluid under pressure, and means down stream this passage, for obliging both fluids to mix *a*together before leaving the hollow body, the cross-section *area* ~~aera~~ of the body at the point where said passage is made, and the cross-section *area* ~~aera~~ of the body immediately down stream this passage being both larger than the free streaming section for the fluid under pressure immediately up stream said passage.

6. A device for intimately mixing fluids one of which is under pressure, comprising, in combination, a hollow cylndrical body connectable to a delivery-pipe of fluid under pressure, *a* staggered passage-ways, in the wall of said body *for the admission of* ~~connected to a space containing~~ a fluid to be mixed to the fluid under pressure, and means down stream this passage, for obliging both fluids to mix together before leaving the hollow body, the cross-section *area* ~~aera~~ of the body at the point where said passage is made, and the cross-section *area* ~~aera~~ of the body immediately down stream this passage being both larger than the free streaming section for the fluid under ~~pressure immediately up stream said passage.~~

7. A device for intimately mixing fluids one of which is under pressure, comprising, in combination, a hollow cylndrical body connectable to a delivery-pipe of fluid under pressure, (*opposed* ~~staggered~~ passages) in the
10 wall of said hollow body, each of which being *open for the admission of* ~~connected to a closed space containing~~ a fluid to be mixed to the fluid under pressure, and means down stream these passages, by which the fluids are forced to mix together, before they escape from

the hollow body, the section *area* ~~aera~~ of the hollow body at the point of each of these passages, and the section *area* ~~aera~~ of the body immediately down stream each passage, being larger than the free streaming section for the fluid under pressure immediately up stream each of these passages.

8. A device for intimately mixing fluids one of which is under pressure, comprising, in combination, a hollow cylindrical body connectable to a delivery-pipe for the fluid under pressure, *alined* ~~a crown of~~ holes in the wall of said body, *said holes* ~~certain~~ of these holes ~~being~~ *being adapted to admit at least one open for the admission of* ~~connected to a closed space containing~~ a fluid to be mixed to the fluid under pressure, ~~other holes being~~ *also open for the admission of air and* ~~connected to another closed space also containing a fluid to be mixed with the fluid under pressure~~, means up stream ~~this~~ *said* ~~crown of~~ holes whereby the stream of fluid under pressure is divided into separate streams, a diametrical partition in the hollow body, dividing the space surrounded by *said* ~~the crown of~~ holes into to separate chambers into which flow the separate streams of fluid under pressure, means down stream this partition comprising longitudinal diverging holes for the fluid under pressure and the other fluids, means down stream this means for mixing all the fluids together before they escape from the hollow body, the sectional *area* ~~aera~~ of the hollow body, at the point where the crown of holes is provided, and the sectional *area* ~~aera~~ of the hollow body immediately down stream these holes being larger than the free streaming passage for the fluid under pressure immediately up stream *said first* ~~this crown of~~ holes.

9. A device for intimately mixing fluids one of which is under pressure, comprising, in combination, a hollow cylindrical body connectable to a delivery-pipe for the fluid under pressure, a crown of holes in the wall of said body, certain of these holes being ~~connected to a closed space containing~~ *open for the admission of* a fluid to be mixed to the fluid under pressure, ~~other holes being~~ *also open for the admission of a second* ~~connected to another closed space also containing a fluid to be mixed with the fluid under pressure,~~ means for controlling the free section of these holes, means up stream *said* ~~this crown of~~ holes whereby the stream of fluid under pressure is divided into separate streams, a diametrical partition

in the hollow body, dividing the space surrounded by *said* ~~the crown of~~ holes into separate chambers into which flow the separate streams of fluid under pressure, means down stream this partition comprising longitudinal diverging holes for the fluid under pressure and the other fluids means down stream this means for mixing all the fluids together before they escape from the hollow body, the sectional *area* ~~aera~~ of the hollow body, at the point where the crown of holes is provided, and the sectional *area* ~~aera~~ of the hollow body immediately down stream these holes being larger than the free streaming passage for the fluid under pressure immediately up stream *said first* ~~this crown of~~ holes.

10. A device for intimately mixing at least two fluids, one of which is under pressure, comprising in combination a hollow cylindrical body connectable to a delivery-pipe of fluid under pressure, a passage-way in the wall of said hollow body, *for admitting a fluid to said body said passageway* ~~an elastic duct connected to this passage-way, this duct being~~ connected to a closed space containing a fluid to be mixed to the fluid under pressure, means, down stream this passage-way, for obliging both fluids to mix together before leaving the hollow body, the cross-section *area* ~~aera~~ of the body at the point where said passage is made, and the cross-section *area* ~~aera~~ of the body immediately down stream this passage being both larger than the free streaming section for the fluid under pressure immediately up stream said passage.

11. A device for intimately mixing fluids one of which is under pressure, comprising in combination a cyln-
12 drical hollow body connected to a delivery-pipe for the fluid under pressure, a passage-way in the wall of the hollow body, connected to a rigid duct opening in free air, means down stream this passage-way, for obliging both fluids to mix together before leaving the hollow body, the cross-section *area* ~~aera~~ of the body at the point where said passage is made, and the cross-section *area* ~~aera~~ of the body immediately down stream this passage being both larger than the free streaming section for the fluid under pressure immediately up stream said passage, a pipe connecting the free end of the hollow body to a tank, and a tap at the entrance of this tank.

Elie Aghnides

13

OATH

American Consulate }
Brussels, Belgium } ss::

Elie Aghnides, the above-named petitioner, being sworn (or affirmed), deposes and says that he is a citizen of the Greek Republic and resident of Brussels, Belgium. that he verily believes himself to be the original, first and sole inventor of the improvements in Fluid mixing devices in which one of the fluids is under pressure. described and claimed in the annexed specification; that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or patented or described in any printed publication in any country before his invention or discovery thereof, or more than two years prior to this application, or in public use or on sale in the United States for more than two years prior to this application; that said invention has not been patented to himself or to others with his knowledge or consent in this or any foreign country for more than two years prior to this application, or on an application for a patent filed in any country foreign to the United States by himself or his legal representatives or assigns more than twelve months prior to this application; and that no application for patent on said improvement has been filed by himself or his representatives or assigns in any country foreign to the United States, except as follows: Belgium, December 8th 1934.

(Inventors Full Name:)—Elie Aghnides

Sworn to and subscribed before me this 23rd day of November, 1935.

/s/ Janson Gilbert
(Signature of U. S. Consul.)
Vice Consul of the United States
(Official Character)

American Foreign Office
$2.00 Fee Stamp

14

52923 #2

Fig. 1

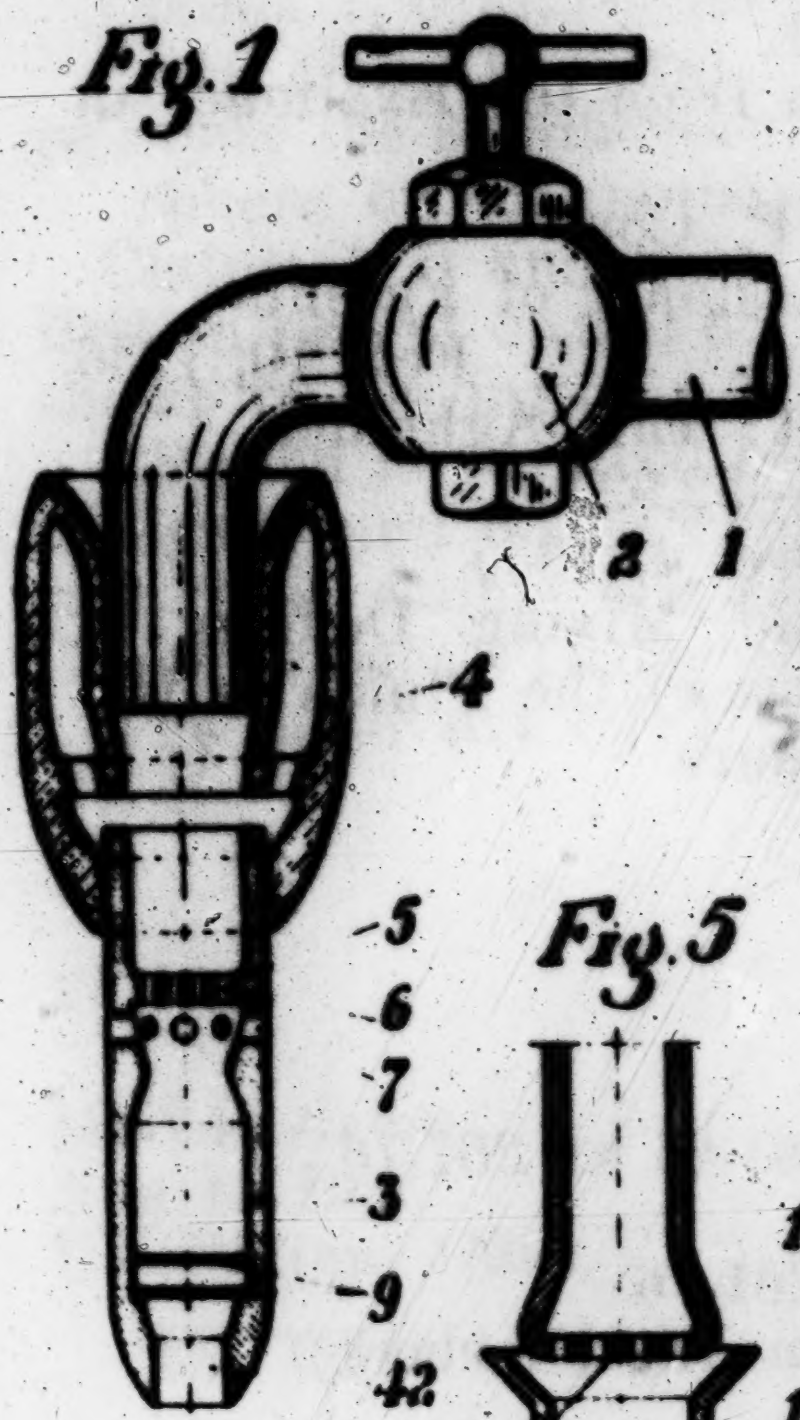


Fig. 2

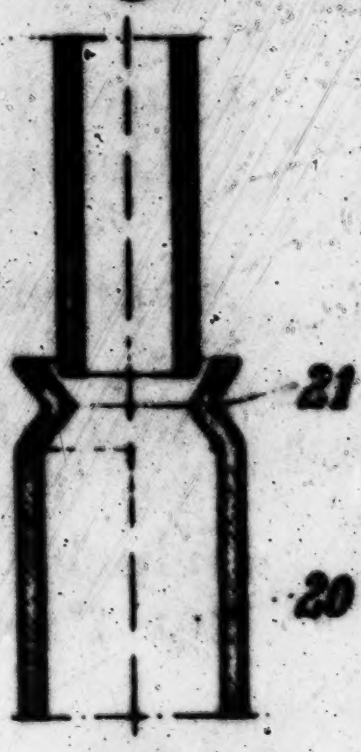


Fig. 3

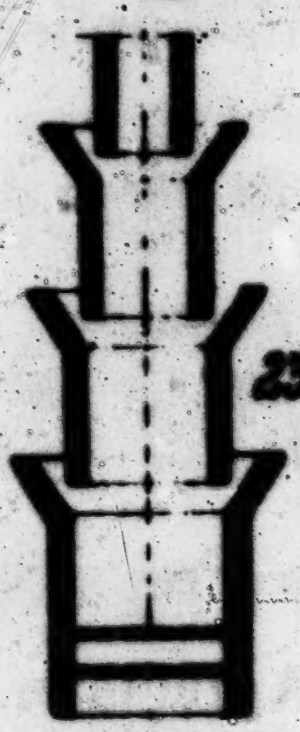


Fig. 4

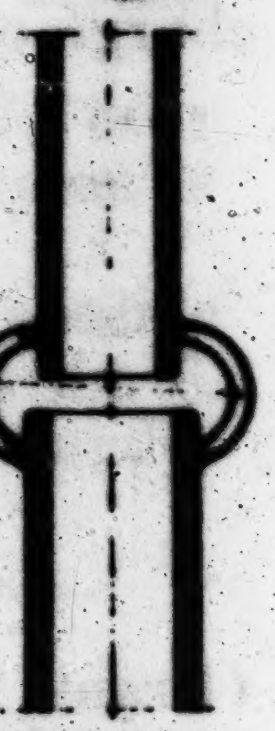


Fig. 5

Fig. 7

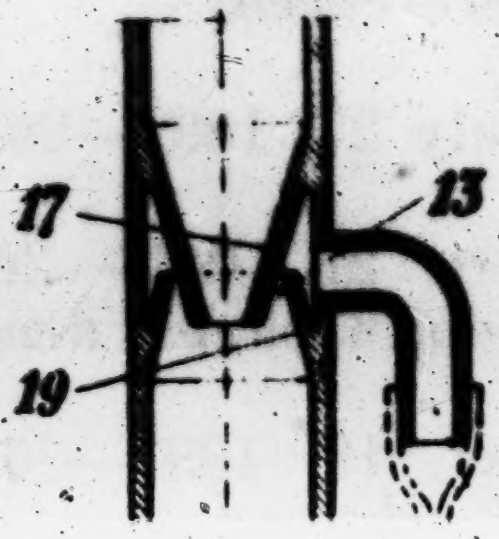
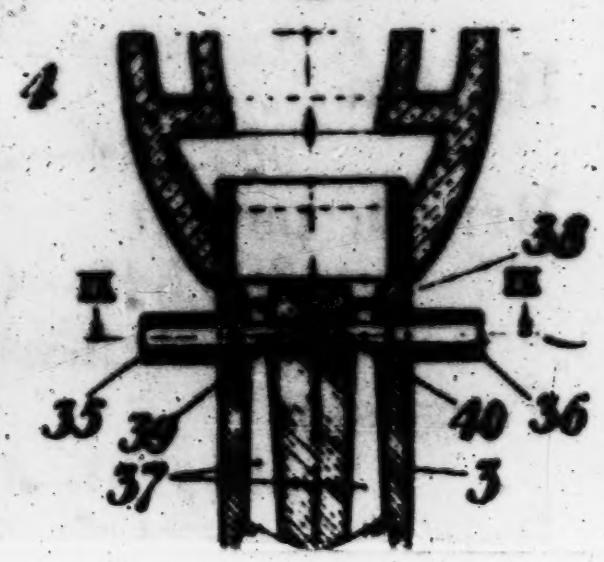


Fig. 8



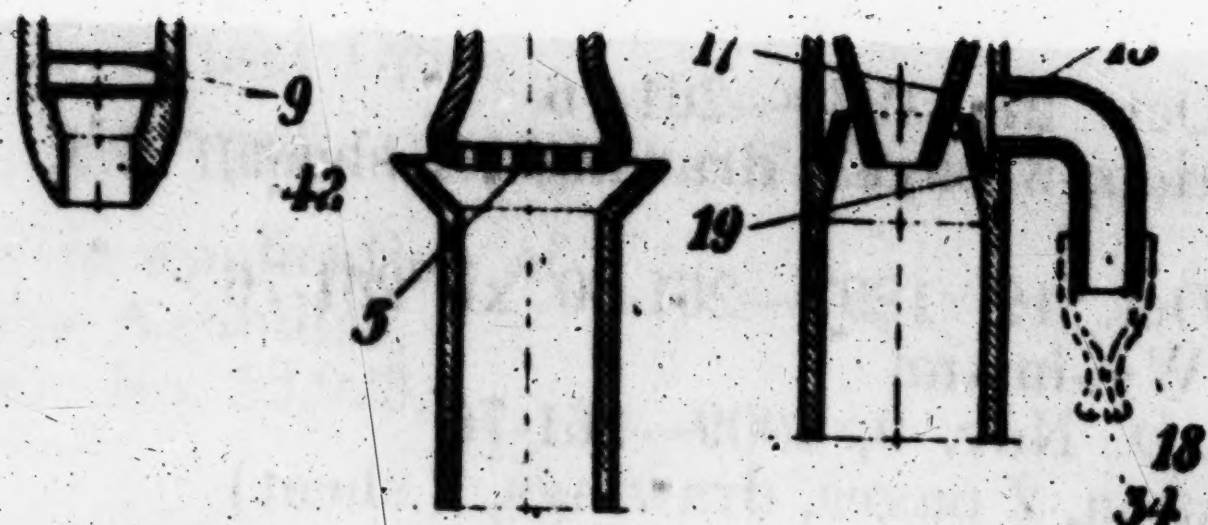
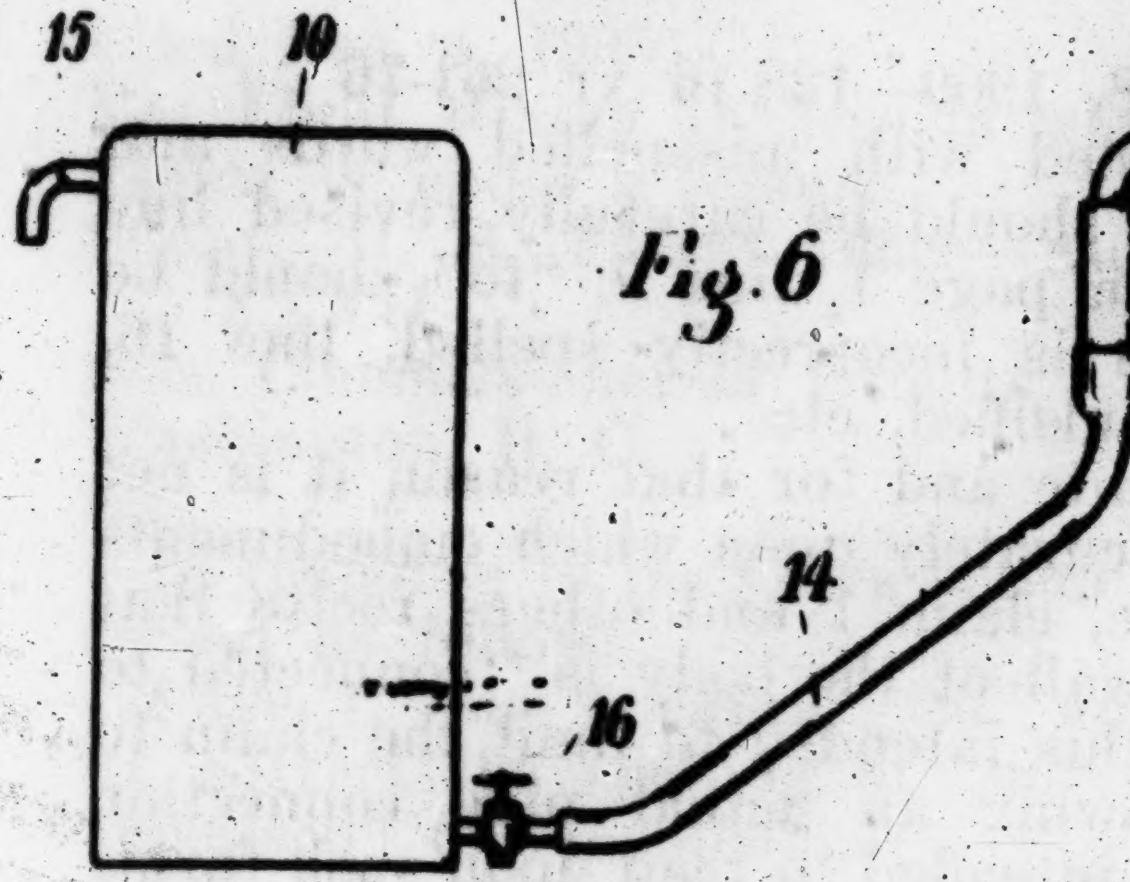


Fig. 6



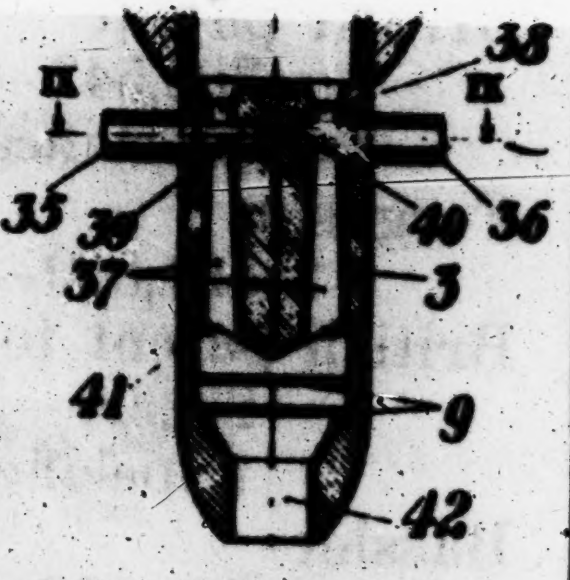


Fig. 9

Inventor
Elie Aghnides
Attorney.

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15 Letterhead—

DEPARTMENT OF COMMERCE
United States Patent Office
Washington

Please find below a communication from the Exaimner in charge of this application.

Conway P. Coe
Commissioner of Patents
Feb. 10, 1936

Applicant: Elie Aghnides
Ser. No.—52,923
Filed—Dec. 4, 1935
For Fluid Mixing Devices in Which One of the Fluids Is Under Pressure

(Frank S. Appleman,
1331 G St., N. W.,
Washington, D. C.)

References:

Heaton
587,203—July 27, 1897—261-66 xr 261-76

British patent
382,542—Oct. 27, 1932—261-76
(specification, 3 pages, drawings, 1 sheet)

Ferguson
591,830—Oct. 19, 1897—261-60 xr 261-76

British patent to Weidmann
25,900—A.D. Nov. 9, 1909—261-76
(Specification, 2 pages, drawings, 1 sheet)

Bassler
944,252—Dec. 28, 1909—128-16 xr 261-76

The description is filled with misspelled words and grammatical errors and should be carefully revised line by line. For example on page 1, line 9, "to" should be with, line 13, agreeable is incorrectly spelled, line 16, "emulsed" should be emulsified, etc.

The claims are indefinite and for that reason it is not possible to determine accurately upon which embodiments they read. For example, claim 1 and others recite that the passageway in the wall of the body is "connected to a space • • • etc." Is this intended to limit the claim to those embodiments showing an actual pipe connection such as 18 to 35 or is it intended to read upon such forms as figs. 1 to 5?

Claims 2 to 4 and 7 to 11 are clearly readable only upon figs. 7 and 8.

Claim 6 is clearly readable only upon fig. 6.

Claims 1, 5 and 6 may be regarded as generic, assuming that the term "connected to a space, etc." has
16 only the significance that the holes are open to atmosphere or to another fluid.

Claims 1, 5 and 6 are rejected as not patentable over British patent 25,900 of 1909, in which a mixing screen is shown in the injector H.

Election is required between claims indicated as specific to figs. 7 and 8 and claims indicated as specific to fig. 6, and these claims are *not* acted upon at this time under Commissioner's Order 3254.

The other art cited is for applicant's information.

CWM—

J. A. Bartholomew
Examiner.

17

Paper No.: 4
Amendment A

Mail Division
Aug 10 1936
U.S. Patent Office

IN THE UNITED STATES PATENT OFFICE

In re application of
Elie Aghnides,
Ser. No. 52,923,

Room 4086
Div. 32.

Filed Dec. 4, 1935,
For Fluid Mixing Devices in which one of the Fluids is under Pressure.

Stamp—U. S. Patent Office—Aug. 13, 1936—Division XXXII

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

In response to the Office action of Feb. 10, 1936, kindly amend as follows:

Page 1, line 9, cancel "to" and insert —with—; line 13, correct the spelling of "agreeable"; line 16, change "emulsed" to —emulsified—.

Claims 1, 5 and 6, lines 4 and 5; and claims 2, 3 and 4, line 6; cancel ", connected to a space containing" and insert —for the admission of—.

Claims 7, 8 and 9, line 5; claim 10, line 6, cancel "connected to a closed space containing" and insert —open for the admission of—.

Claim 8, line 7 and claim 9, lines 6 and 7, cancel "being connected to another closed space *also* containing a" and insert —also open for the admission of a second—

Claims 1 and 6, lines 8 and 9; claims 2, 3, 4 and 10, lines 9 and 10; claim 5, lines 7 and 9; claim 7, lines 8 and 10; claim 8, lines 17 and 18; claim 9, lines 18 and 19; and claim 11, lines 7 and 8, change "aera" to —area—

Cancel claims 1, 5, 6 and 11 without prejudice.

18 REMARKS

The Examiner's division of the claims is not understood. Claim 11, not claim 6, would seem to be the sole claim reading on Fig. 6. Note the recital of the tap 16 in the last line of claim 11. As claim 6 is later noted as being generic, evidently claim 11 was meant.

The objectionable language "connected to a space—etc." has been corrected and the meaning of the claims should now be clear. Other formal corrections to the specification and claims will be made upon the indication of allowable subject matter.

Claims 1, 5, 6 and 11 have been canceled and an action on the merits of claims 2-4 and 7-10 is respectfully requested.

Respectfully submitted,
Elie Aghnides,
By Frank S. Appleman,
Frank S. Appleman, Attorney.

Washington, D. C.,
August 10, 1936.

19 Letterhead—

DEPARTMENT OF COMMERCE
United States Patent Office
Washington

Oct. 23, 1936

Please find below a communication from the EXAMINER in charge of this application.

Conway P. Coe
Commissioner of Patents

Applicant: Elie Aghnides
Ser. No.—52,923
Filed—Dec. 4, 1935
For Fluid Mixing Devices in which One of the Liquids is under Pressure

(Frank S. Appleman,
1331 G St., N. W.,
Washington, D. C.)

As amended Aug. 10, 1936.

Requirement for revision of the specification line by line to correct unidiomatic and ungrammatical expressions is repeated. The specific examples to which attention was called have been corrected. Others have been left unchanged as for instance "non-limitating" in line 8, "this water is more digestive" in line 14; "realizes • • • a foamy emulsion" in line 16; "serious economy of soap and time" in line 17; "confers to" in line 19; all the above being on page 1.

The element 34 must either be shown in solid lines or erased. The use of dotted lines to show alternative construction is objectionable.

The claims have been carefully reconsidered as to which embodiments each is readable upon.

Claims 2 to 4 appear to read upon Figs. 1 and 8. In claim 7, to what does the staggered passages refer? As now viewed this expression appears to limit the claim to Fig. 3 although the description does not call these passages "staggered."

Incidently Fig. 3 bears no reference numerals, which is also objectionable.

Claims 8 and 9 call for "a crown of holes." To what does this refer? Holes 7 of Fig. 1 are called a "ring of holes." Perhaps this is what is meant. But Fig. 8 shows only two holes. These two do not constitute a "crown." However, Fig. 1 does not show separate holes connected to separate fluid sources. It therefore is not apparent how claims 8 and 9 can be read upon any embodiment.

Claim 10 recites an "elastic duct", "connected to a closed space". Upon which figure is this intended to read? Apparently the only figure showing an elastic duct is Fig. 7 and this duct 34 is not shown as leading to a closed space.

Apparently claims 2 to 4 are for allowable subject-matter, and readable upon Figs. 1 and 8 only.

For the reasons indicated claims 7 to 10 are held to be not readable upon any figures and are rejected upon that ground.

Apparently considerable revision of the drawing and claims is going to be necessary. Rule 50 requires that the drawing show every feature claimed. This requirement is not satisfied by building up the claimed structure from selected features picked at random from some half-dozen illustrated embodiments.

H. A. Armstrong
Acting Examiner

CWM
21

Letter to Draftsman

U. S. Patent Office
(Stamp—Apr 27 1937 Division XXXII)

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Ser. No. 52,923 Div. 32
Filed Dec. 4, 1935 Room 4086
For Fluid Mixing Devices in which
One of the Liquids is under Pressure

LETTER TO DRAFTSMAN

Hon. Commissioner of Patents,

Sir:

Please correct the drawings of the above case as indicated in red ink on the attached prints and charge the cost to the account of the attorney, Frank S. Appleman.

Respectfully submitted,
Frank S. Appleman
Frank S. Appleman, Attorney.

Apr. 23, 1937
Not approved

Fig. 1

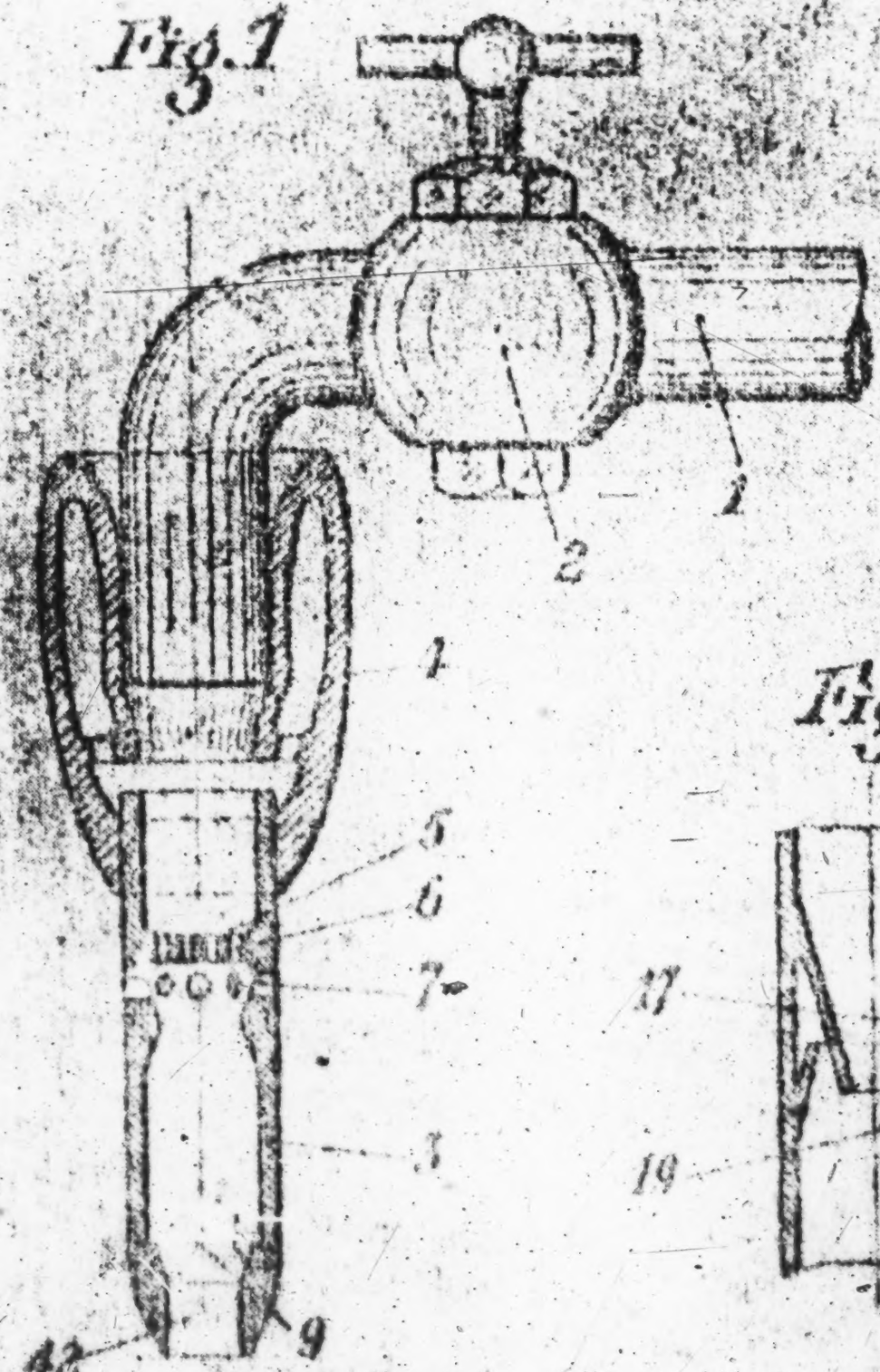
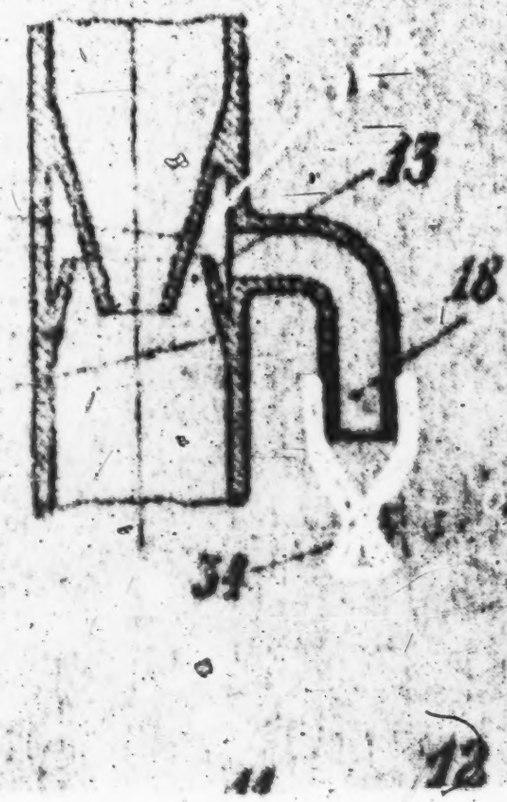


Fig. 7



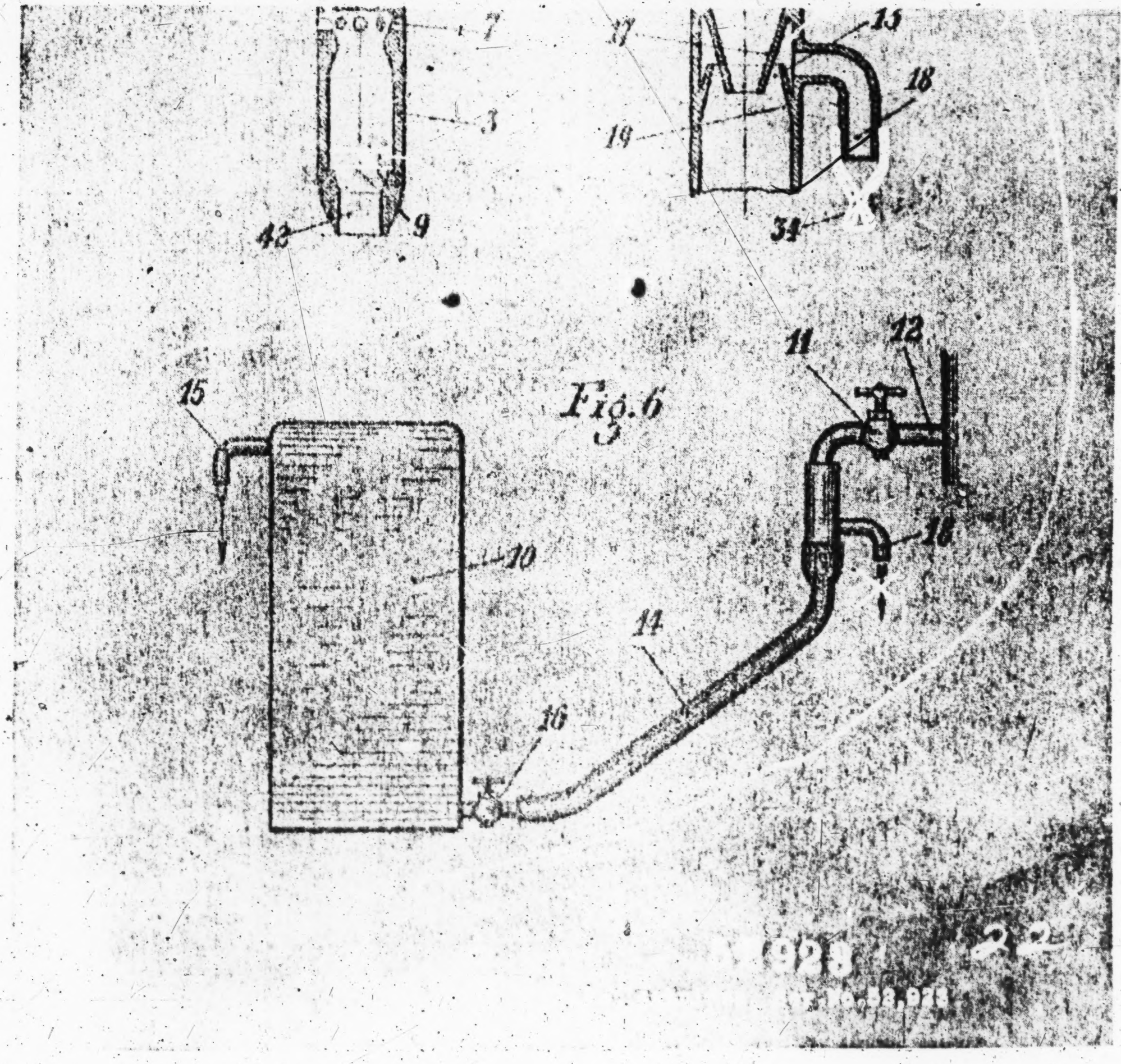


Fig. 6

24 Paper No. 7
Amendment B

Patent Office Stamp—Apr 23 1937

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Ser. No. 52,923 Div. 32
Filed Dec. 4, 1935 Room 4086
For Fluid Mixing Devices in which
One of the Liquids is under Pressure
Hon. Commissioner of Patents,
Sir:

Responding to the official letter of Oct. 23, 1936, the above entitled application is hereby amended as follows:

Page 1, line 8, cancel "but non-limitating case" and insert —embodiment of the invention,—.

Line 10, cancel "obtain" and insert —form at true water and air emulsion—.

Line 10, change the comma (,) to a period (.) and cancel "a".

Line 11, cancel "true water and air emulsion."

Lines 14 and 15, cancel "digestive" and insert—digestible—.

Line 16, cancel "realizes with soap" and insert —and forms—.

Line 17, after "emulsion" insert —with soap—. Also cancel "serious" and insert —real—.

Line 19, cancel "confers to" and insert —gives—

Line 20, cancel "realizes" and insert —causes—.

Line 22, change "pratical" to —practical—. Also cancel "consists" and insert —of the invention occurs,—.

Line 22, insert a comma (,) after "instance".

Line 24, cancel "compelled to"

Line 25, cancel "according to" and insert —of—. After "be" insert —thereby—.

25 Page 1, line 27, cancel "resistant" and insert —lasting—.

Line 28, cancel "comprises" and insert —includes—; also cancel "cases" and insert —instances—

Page 2, line 5, after "pressure" insert —through the device—

Line 6, after "and" insert —of—. Cancel the comma (,).

Line 7, change the comma (,) after "pressure" to a period. Also change "the" (second occurrence) to —The—.

Line 8, after "the" insert —cross—.

Line 15, before "either" insert —formed—.

Line 15, cancel "which contracts itself" and insert —being contracted at its lower end—.

Line 16, cancel "eventually enters in" and insert —extending into—. Also, after "or" insert —formed—.

Cancel line 17 and insert —being widened at the top to receive the lower end of the part above, or with the part—.

Line 18, after "above" insert —being—.

Line 18, after "passage" insert —and extending therein—.

Line 21, cancel "or call of" and insert —and draws—. Also cancel "and this air" and insert —which—.

Line 23, cancel ", provided to that end, with" and insert —by means of—.

Line 24, after "baffles" insert —provided for this purpose—.

Line 26, cancel "in certain cases or applications" and insert —by various means—.

Line 27, cancel "it contributes to considerably" and insert —wherein it acts to—. Also after "plant" insert —considerably—.

Line 29, change "fig." to —Fig.—. Also, after "an" insert —vertical and—. Change "an" to —a—

Line 31, change "fig." to —Figs.— Also cancel the matter after "5" and insert —inclusive are vertical axial sections of modifications of the aerating device of Fig. 1,—

26 Page 2, line 32, change "fig." to—Fig.—.

Page 3, line 1, change "fig." to—Fig.—.

Line 1, cancel "cross-section at" and insert—vertical axial section on—.

Line 2, change "figure" to—Figure—.

Line 3, change "fig." to—Fig.—.

Line 3, cancel "a cross section through a modified form" and insert—an axial vertical section of a further modification—.

Line 5, change "fig." to—Fig.—.

Line 6, change "figure" to—Figure—.

Line 7, change "figure" to—Figure—.

Line 7, cancel "for instance".

Line 11, cancel "this is realized by means of" and insert—shown comprises—.

Line 13, after "part" insert—3—.

Line 13, after "provided" insert—with—and cancel the rest of the line.

Line 14, cancel "a transversal" and insert—an internal transverse—.

Line 15, after "the" (second occurrence) insert—air—.

Line 16, after "surface" insert—thereof. The—. Line 16, cancel "between the water and the air; the".

Line 18, cancel "Above" and insert—Below—.

Line 19, cancel "in respect to the current of water".

Line 20, after "of" (second occurrence) insert—the total section of said holes 7 of—.

Line 21 at the end of the line insert—said—.

27 Page 3, cancel lines 23 and 24.

Line 26, change "of" at the beginning of the line to—or—Also cancel "realize" and insert—form—.

Line 27, cancel "ensuring" and insert—to insure—.

Line 28, cancel "total section of passage" and insert—diameter— .

Line 29, change "fig." to—Fig.—. After "5)" place a period (.) and cancel the rest of the line.—

Line 30, cancel "water. In the same way, the" and insert—The—.

Line 31, change "figures" to—Figures—.

Line 32, after "5" insert—inclusive—.

Line 33, change "figure" to—Figure—. Also cancel "upper" and insert—lower—.

Page 4, line 1, cancel "below" and insert—20ª above—.

Line 2, after "expanding" insert—or venturi—.

Line 2, change "figure" to—Figure—. also cancel "is".

Line 3, cancel "manifold and". After "stepped" insert —and funnel mouthed—.

Line 3, after "rings" insert—50, 51, 52, each respectively being of a smaller diameter than the one immediately below it. Said rings are axially alined with each other and with a still smaller fluid admission pipe 53 above the upper ring 52. Annular spaces 50ª, 51ª and 52ª admit the air.—.

Cancel "and" at the end of line 3.

Line 4, cancel "in figure" and insert—Figure—; cancel the matter after the numeral "4" and insert—shows a

lower pipe 60 connected to a smaller upper pipe 61 by means of clips 23.—.

28 Page 4, cancel line 5 and insert—The adjacent pipe edges 60ª and 61ª are spaced slightly to provide an annular air admission space.—

Cancel line 6.

Between lines 6 and 7 insert—

—Fig. 5 discloses a lower pipe 70 having a flared mouth 71. Above the pipe 70 and spaced slightly therefrom to provide an annular air admission space is a smaller pipe 75. The lower end of the pipe 75 is flared as at 72 and closed by a partition 73 through which a plurality of holes 74 are formed.—

Line 7, change "figure" to—Figure—

Line 9, change "device" to—devices—. Also, after "in" insert—any of—

Line 10, cancel "one part of holes 7 is in relation" and insert—at least one hole corresponding to one of the holes 7 of Fig. 1 is connected—.

Line 11, cancel "comprising" and insert—containing—.

Line 11, after "other" insert—corresponding holes are connected—.

Lines 11 and 12, cancel "part in relation".

Line 12, cancel, "comprising" and insert containing—.

Line 12, cancel "; those" and insert—. Those—.

Line 14, cancel "mix" and insert—be mixed—.

Line 14, cancel "thanks to" and insert—by—. Also cancel "sift" and insert—wall—.

Line 16, change "3" to—3ª—.

Line 18, cancel "or space".

Line 19, cancel "; each" and insert—. Each—.

Line 20, change "3" to—3ª—. Also cancel the matter after "through".

29 Serial No. 52,923—6

Page 4, cancel line 22 and insert—The upper part of the body 3ª is solid—.

Line 23, cancel "nature,"; also cancel "through". After "part" cancel the comma (,) and insert —is provided with—.

Line 24, after "section" insert —in a downward direction—.

Line 24, cancel "are pierced",.

Line 26, change "succion" to —suction—.

Line 26, cancel "ports 7′ : a" and insert —the ducts 35 and 36. A—.

Line 27, change "in" to —into—; after "body" change "3" to —3ª—.

Line 28, change "3" to —3ª—.

Line 30, change "This" to —Thus—.

Line 33, cancel ": both" and insert —. Both—.

Line 34, cancel "through" and insert —by vertical—.

Line 35, change "3" to —3ª—.

Page 5, line 1, change "9" to —9ª—.

Line 2, after "shown" insert —in—. Change "figure" to —Figure—. Cancel "allow" and insert —be capable

Line 3, cancel "to mix" and insert —of mixing—.

Line 4, after "passage" insert —7—

Line 4, cancel "or space".

Line 5, change "figures" to —Figures—

Line 6, cancel "end of part 3 a" and insert —lower ends of the parts 3, 3ª, 20, 50, and 70, a—.

Line 8, cancel "sift" and insert —wall—.

Line 9, change "figures" to —Figures—

Line 12, cancel "diffused" and insert —general—.

30 Serial No. 52,923—7

Page 5, line 15, cancel "those plants had a drawback:"

Line 19, change "softering" to —softening—.

Line 23, cancel the matter after the period (.)

Cancel line 24.

Line 28, change "figure" to —Figure—.

Line 29, after "correspondence" insert —generally—.

Line 29, change "figure" to —Figure—.

Line 30, cancel "slits or holes are formed in a circular". and insert —is admitted from an annular—

Line 31, cancel "ending up in" and insert —18ª surrounding and connecting the adjacent ends of an upper and a lower pipe 17ª and 19ª respectively. The chamber 18ª has —.

Line 31, after "18" insert —formed thereon—.

Line 32, change "figure" to —Figure—.

Line 32, cancel done away with according to" and insert —eliminated as in Figs. 2-4 inclusive—

Line 33, cancel "a modified form."

Line 33, after "converging" insert —end 17 of the upper—.

Line 33, cancel "or contracting"; change "17" to —17ª—.

Page 6, line 1, after "a" insert —reduced end 19 of a—. After "pipe" change "19" to —19ª—.

Line 2, cancel ", itself connected" and insert —and—.
Line 3, change "17-19" to —17ª-19ª—.
Line 3, cancel "a free ring" and insert —an annular space—.
Line 4, before "nozzle" insert —chamber 18ª and—.
Line 9, change "figure" to —Figure—.
Line 12, change "Thanks to" to —On account of—.
Line 13, cancel "vacuum" and insert —suction—. Line 14, change "fig." to —Fig.—
31 Claim 7, line 4, cancel "staggered" and insert —opposed—.
Claims 8 and 9, line 4, cancel "a crown of" and insert —alined—.
Lines 4 and 5, cancel "certain of ——container for a" and insert —said holes being adapted to admit at least one—.
Lines 6, 7 and 8, cancel "other holes—under pressure".
Claim 8, line 8, cancel "this".
Line 9 cancel "crown of" and insert —said—.
Line 11, cancel "the crown of" and insert —sand—.
Claim 9, line 9, cancel "this crown of" and insert —said—.
Line 12, cancel "the crown of" and insert —said—; also cancel "to".
Claims 8 and 9, last line, cancel "this crown of" and insert —said first—.
Claim 10, cancel line 5 and insert —for admitting a fluid to said body, said passageway being—.

REMARKS

The specification has been carefully revised to correct the formal errors therein.
Corrected prints and a letter to the Chief Draftsman is attached.
Claims 2, 3, 4 stand allowed.
Claims 7-10 inclusive have been amended to define the invention claimed more clearly and are now believed to be free from the noted objections. As no art has been cited, these claims should now be allowable.
cited, these claims show now be allowable.

E. Aghnides
By Frank S. Appleman
Frank S. Appleman, Attorney.

Apr. 23, 1937 A•S•L

32

Paper No. 8
Amendment C

U. S. Patent Office Stamp—Apr. 30 1937

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Serial No. 52,923
Filed Dec. 4, 1935

Stamp—U. S. Patent Office—May 3, 1937
Division XXXII.

For Fluid Mixing Devices in which
One of the Liquids is under Pressure
Hon. Commissioner of Patents,
Sir:

Supplemental to amendment filed Apr. 23, 1937, additional amendment is hereby made as follows:

Cancel the matter inserted on page 5, line 6.

Page 5, line 6, after "the" (second occurrence) insert —lower ends of the parts 3, 3ª, 20, 50, 60 and 70, a—

Respectfully submitted,
Elie Aghnides
By Frank S. Appleman
Frank S. Appleman, Attorney.

A-LBL
Apr. 30, 1937

33 Letterhead

DEPARTMENT OF COMMERCE
United States Patent Office
Washington

Please find below a communication from the EXAMINER in charge of this application.

Conway P. Coe
Commissioner of Patents
Mailed Jul 14 1937

Applicant: Elie Aghnides
Ser. No.—52,923
Filed—Dec. 4, 1935
For Fluid Mixing Devices
in which one of the fluids
is under pressure

(Frank S. Appleman,
1331 G St., N. W.,
Washington, D. C.)

As amended Apr. 23 and 30, 1937.

Permission to amend the drawing with respect to Fig. 1 and Fig. 3 is not granted. There is nothing in the amended specification to indicate what 9 and 9b are supposed to represent as amended. In any event, the amendment does not show "two perforated plates" as described in the original description. This portion of the amendment is held to be new matter.

The case now contains claims 2, 3, 4 and 7 to 10.

Claims 2, 3 and 4 are held to read upon figs. 1 and 8 only.

Claims 8 and 9 could not be amended as directed since the claims do not contain the words "container for a". It is impossible to tell what applicant wants to have cancelled.

As near as the examiner can determine, claim 7 reads only upon figs. 1 and 8 also.

Claim 10 does not read upon any figure. Which embodiment shows cylindrical body connected to "a delivery pipe of fluid under pressure" and also to a closed space containing a fluid to be mixed to the fluid under pressure? The examiner can find no such structure shown.

It appears obvious from the art of record that the broad of idea of aspirating a gas into a liquid stream is old in numerous structures similar to applicant's and that any invention in this case lies in specific details of the aspirator. Applicant has shown some eight forms of aspirators. It is obvious that these cannot all be covered by a generic claim.

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From the present informal condition of the claims it is not possible to tell what species they are intended to cover but it is clear that none even purport to be generic. For example, none purport to cover figs. 2 to 4.

In accordance with Commissioner's Order 3254, to which applicant's attention was previously called, he is required to elect the preferred species in his response.

He is further required to rewrite the entire specification and claims 8 to 10, as these claims, as well as the specifications, are substantially unreadable because of numerous amendments.

After two office actions and two responses the case does not appear to be sufficiently clear to enable the art to be applied in any intelligent manner. No generic claims appear in the case and no election of species has been made.

A new direction should be sent for amendment of the drawing, omitting the parts which are for new matter.

In view of the informal condition of the case an early response is urged.

Fish
Examiner.

CWM

35 Mail Division
Jan. 4, 1938
U. S. Patent Office

Stamp—U. S. Patent Office—Jan 6 1938—Division XXXII.

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Serial No. 52923
Filed Dec. 4, 1935
For Fluid Mixing Devices

Div. 32
Room 4086

Hon. Commissioner of Patents,

Sir:

Owing to the fact that a continuing application has been filed under date of December 31, 1937, Serial No. 182884, which also includes the subject matter of this application, this application is not further prosecuted.

Respectfully submitted,
Elie Aghnides,
By Frank S. Appleman
Frank S. Appleman, Attorney.

Jan. 4, 1938
FSA*LBL

Not up for action. Is response necessary. Will become abandoned Jan. 14.

See that continuing case referred to contains proper reference to this case.

47

1935

CONTENTS

1. Application ..... papers.
2. Trial—Dec. 9, 1935
3. Rejection—Feb. 10, 1935
4. Amendment—A—Aug. 10, 1936
5. Rejection—Oct. 23, 1936
6. Letters to Draftsman—2 Prt—Apr. 23, 1937
7. Amendment—B—Apr. 23, 1937
8. Amendment & Suppl.—Apr. 30, 1937
9. Letter—Jul. 14, 1937
10. Letter—Jan. 4, 1938
11. Petition for Access—Dec. 14, 1942
12. Petition for Access—Feb. 9, 1944
13. Petition for Access—Feb. 12, 1944
14. Petition for Access—Nov. 25, 1947
15. Petition for Access—Apr. 22/48
16. Petition for Access—Mar. 18, 1949
17. Petition for Access—Nov. 10, 1949
18. Petition for Access—Jan. 25, 1950
19. Petition for Access—Jan. 30-50
20. Petition for Access—June 2, 1950

Note

Page 2 App. 49 is
on Card 8.

(Stamp—U.S. Patent Office Dec. 31, 1937)
Dec. 31-37, 123408
K—Check—30.00

1

PETITION

To the Commissioner of Patents:

Your petitioner, ELIE AGHNIDES, a citizen of the Greek Republic, and a resident of Brussels, Belgium, whose post-office adress is *609 West 158th St., New York, N. Y.* ~~11 Boulevard Waterloo, Brussels, Belgium,~~ prays that letters patent may be granted to him for the invention in FLUID MIXING DEVICES, set forth in the annexed specification; and he hereby appoints FRANK S. APPLEMAN, of 1331 G. Street, Northwest, Washington, D. C., his attorney, with full power of substitution and revocation, to sign the drawings, to prosecute his application, to make alterations and amendments therein, to receive the patent, and to prosecute all business in the Patent Office connected therewith.

Elie Aghnides

(U. S. Patent Office Jan 10 1938 Division XXXII)

SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN That I, ELIE AGHNIDES, a citizen of the *New York* ~~Greek Republic,~~ residing at *New York,* ~~Brussels, Belgium,~~ have invented certain new and useful improvements in FLUID MIXING DEVICES, of which the following is a specification:

2 This invention relates to a device for intimately mixing a gas with a liquid, and ordinarily is employed for aerating water. This application is a continuation in part of my earlier application Serial No. 52,923, filed December 4, 1935.

Broadly speaking, my invention consists of a device intended to be connected to a source of liquid under pressure, such as an ordinary water tap, and includes a chamber provided with *one or more aperatures* ~~an aperature~~ through which the water is forced into the chamber with substantial velocity and as a result the liquid stream has very substantial kinetic energy. Proper openings are provided leading into the chamber from the outside air

so that the flow of water will draw air into the chamber according to the well-known venturi principle. In accordance with my invention, ~~baffle~~ means are provided in the path of the *III* water jet ~~so that when the water strikes them this baffle, its kinetic energy will be utilized to break up the stream into fine particles or drops which thoroughly mix with air~~. An outlet for the chamber is provided from which the water mixed with air can emerge. It is advisable to have the outlet of smaller cross section than the *cross section of the* chamber so that the water will flow in a coherent stream; but the outlet should be of sufficient size relative to the aperature *or aperatures* through which the water is introduced into the chamber so that the water mixed with air will emerge at a substantially lower velocity than the water entering the chamber. Of course, when I refer to the outlet forming a coherent stream, I do not mean to imply that the outlet cannot be divided into several such streams, if desired.

3 The essential feature of my invention is an arrangement of the baffle means relative to the inlet aperature so that the force of the stream or jet on striking the baffle serves to break up the stream or jet as much as possible. Accordingly, this baffle must be correctly positioned relative to the inlet aperture to give this result, which demands a proper placing both as regards distance and angle so that the water will have a definite *breaking effect on both fluid and air* ~~splashing effect.~~ A baffle arranged close to the inlet aperature and more or less following the line of the path of the water will not give the desired result but will simply cause the path of the water to be deflected without the water stream being broken up. However, such a deflector could be used to turn the path of the water against the walls of the chamber provided that the pressure is great enough so that when the water is spread out over such deflector it still maintains sufficient velocity so that when striking the walls of the chamber *both water and air is broken up* ~~it is splattered into droplets and mixed with the air.~~

In the referred embodiment of my invention, ~~the aperture through which~~ the water is introduced into the mixing chamber *through* ~~is subdivided into~~ a plurality of apertures, ~~as in this case it is easier to break up each stream into small droplets.~~ Also I find that a highly efficient form

of *dividing means* ~~baffle for causing the~~ *breaking* ~~splattering effect~~ is a fine screen located at the outlet, *and I have found.* ~~Such screen serves a double function, for not only does it serve to cause the streams or jets of water and air to be broken up from the apertures to splash back into the chamber to mix with the air, but it also tends to finely subdivide the air and the water passing through it any bubbles in the emerging water. For this latter reason~~

4 ~~I find~~ that even better results can be obtained if two or more *superposed* screens are used in the outlet discharge. In that case the first screen serves as a baffle and also serves to subdivide somewhat the air bubbles, while the second screen, serves principally to cause a further subdivision of the air *and the water* ~~bubbles.~~ The size of the mesh employed is not critical but I have obtained good results where the holes in the screen measured about .6 square millimeter ~~and the water.~~

My invention can readily be understood by reference to the accompanying drawings, in which Fig. 1 is a sectional view of a device embodying my invention which is shown as attached to an ordinary water faucet through the medium of a connecting device such as is described in my Patent No. 2,071,780; Fig. 2 is a sectional view of a device adapted to be screwed onto an ordinary water pipe; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a sectional view showing a further modified form; Figs. 5, 6, 7 and 8 are additional sectional views showing further modifications; and Fig. 9 is a section on line 9—9 of Fig. 8.

Referring now to Fig. 1, 10 designates an ordinary faucet or tap. 12 is a tap connector, the operation of which is described in detail in my patent above referred to. 14 is the casing of the mixing device enclosing the primary mixing chamber. The perforated screen 16 admits the water into the casing 14 in the form of a plurality of jets. A plurality of air ports 18 are provided for admission of air into the interior of the casing 14. 20 is a screen at the lower part of the casing, and below the screen 20 the casing narrows to form a passage 22.

5 When the water is turned through this device, if the faucet is only opened slightly so that very little kinetic energy is developed in the water as it emerges from the perforations in screen 16, the water will come out of the discharge 22 in a perfectly normal manner.

However, as the water pressure is increased and the velocity increases, the water emerging from the perforations of screen 16 will draw air into the chamber through the ports 18 and this water striking the screen 20 at comparatively high velocity will ~~splatter back into the chamber and be broken up and~~ *finely divided* ~~thoroughly mixed with the air.~~ This water, again contacting with the screen 20, will pass through the screen with the air and emerge from the outlet 22. As the diameter of outlet 22 is substantially greater than the aggregate diameter of the perforations in screen 16, the water will have relatively low velocity as it comes out from the discharge.

When my device is functioning, the water, due to the thorough admixture of air, has characteristics which are surprisingly different from those of water as ordinarily discharged from a faucet. For example, if one's hand is put in the course of the water, the water will flow evenly and uniformly over the surface and will wet the entire surface without splashing. Also it will be found that if the discharge from such faucet is allowed to flow into a weak soap solution, it will make an extraordinary amount of foam, which will be found very useful for washing; for instance, when washing clothes or dishes. Again it will be found that the introduction of the air into the water will raise its dissolved oxygen content and the aeration tends to remove objectionable odors and gases from the water, rendering it more palatable. These effects are apparently due to the extreme thoroughness with which the aeration takes place in my device and the results are quite different from the results obtained by ordinary injection devices in which the air is not thoroughly broken up so that when the two fluids leave the apparatus, the air quickly separates from the water *jet* ~~and affects very little of the water.~~

In the form of device shown in Fig. 2, a metal casing 24 is screwed directly onto the faucet 11. This casing holds the screen 26 against the mouth of the faucet and the casing is provided with an outlet screen 28. A series of ports 30 are provided in the casing to admit air in a manner similar to that already described in connection with Fig. 1.

In Fig. 4 the casing 32 is provided with a union coupling 34 for connection to an ordinary hose bib. The screen 36 is clamped between the casing 32 and the mouth of

the hose bib. Air is admitted to the interior of the casing by a series of horizontal perforations 38. In this case two screens are provided at the outlet as indicated at 40 and 42, which will cause the air bubbles in the water to be somewhat smaller than where only a single screen is employed.

Fig. 5 illustrates a case where a single aperture is employed for admitting fluid to the chamber. In this figure, the casing 44 is screwed to the faucet 46 and clamps in place a plate 48 having a single aperture in the middle. A plate 50 supported by legs 52 is positioned in the lower part of the chamber and below this is ~~preferably~~ po-
7 sitioned a screen 54. The water from the aperture in plate 48 strikes plate 50 and due to its kinetic energy the stream is broken up and thoroughly mixed with the air. ~~Some valuable results could be obtained even if the screen 54 is omitted, but it is advisable to use it.~~

In Fig. 6 the plate 56 has a plurality of holes near the periphery and the casing 58 is formed with inwardly extending projections as indicated at 60. The principal part of the water coming through the openings in the plate 56 will strike these projections and be broken up as previously described. *In this case, a screen 62 is also used in the device.* ~~Here again it is advisable, but not essential, to use a screen as indicated at 62.~~

An effect similar to that shown in Fig. 6 is illustrated in Fig. 7 except that instead of having a plurality of apertures in the plate, the plate 64 has a single central orifice shaped to throw the water outwardly. The casing 66 again has projections as indicated at 68 similar to the projections 60 described above.

Another form of my device is shown in Figs. 8 and 9. In this arrangement it is possible to mix three fluids, one of which is under pressure. Leading into a mixing chamber 72 are a plurality of passages 74 to permit entrance of a fluid under pressure into the mixing chamber 72 enclosed by casing 70. The inlet port 76 intersects and leads into one group of passages 74 near the upper end of the passages; and another inlet port 77 likewise intersects and leads into another group of passages 74. The inlet ports 76 and 77 do not connect with one another; in consequence the channels 74 are grouped into two sections, each section being connected to an inlet port. In this form of my device each inlet port may admit a dif-

ferent fluid into the mixing chamber. The cross-sec-
8 tional area of passages 74 is greater after intersection by inlet ports 76 and 77 and the cross-sectional area of the passages continues to increase as the passages approach the mixing chamber. As in preceding examples, the fluid under pressure courses through passages 74 and draws fluids from inlet ports 76 and 77 into the enlarged portion of passages 74. Baffles 78 project into the passages at the point where the passages discharge into the mixing chamber. The baffles in part interrupt the course of the fluids in each passage and thereby serve to effect a preliminary mixing of the fluids. Within the mixing chamber two screens 80 in spaced relation are placed across the path of the fluids emerging from the passages 74 to interrupt abruptly the course of all such fluids and thereby cause the fluids to mix and sub-divide into minute particles. The fluids are discharged through the outlet 82.

While I have referred to *perforated upstream* plates ~~forming the inlet apertures~~ and *downstream screens* ~~for the outlet baffles~~, it is possible to use perforated plates or (except in certain forms) screens in either position. In the various forms of device shown, the screens and the plates forming the apertures are made readily removable so that the devices can easily be cleaned.

While I have described my device as principally intended for the aeration of water to improve the characteristics of the water for use, it may also be employed for other related purposes such as for washing air or other gases or for cooling, and in connection with such cooling
9 operations it may be employed for causing condensations to take place, and generally speaking my invention can be used for mixing two or more fluids, at least one of which is under pressure.

10 What I claim is:

1. A device of the type described comprising a chamber, an aperture to admit liquid into such chamber, means for delivering to such aperture liquid under sufficient pressure so that the liquid emerging therefrom moves with substantial kinetic energy, a passage leading into such cahmber for the admission of air, baffle means in the path of liquid emerging from said aperture adapted abruptly to interrupt the path of movement of such liquid whereby the kinetic energy of such liquid causes the stream of liquid to be broken up and mixed with the air in said chamber and a passage from said chamber adapted

to discharge the liquid mixed with air at a velocity substantially less than the velocity of the liquid emerging from the aforesaid aperture.

2. A structure as specified in claim 1, in which the liquid is admitted into said chamber through a plurality of apertures.

3. A structure as specified in claim 1, in which the liquid is admitted into such chamber through a plurality of apertures formed in a removable screen.

4. A structure as specified in claim 1, in which the baffle means comprises a screen positioned across the discharge from said chamber.

5. A structure as specified in claim 1, in which the liquid admitted into the chamber passes through a plurality of openings in a screen and a plurality of screens are positioned across the discharge from the chamber ~~and one of such screens serves as a baffle means to interrupt the path of movement of the liquid.~~

11 6. In combination with a water faucet, a casing adapted to be attached to such faucet, a perforated member held across the mouth of such faucet by such casing, a chamber below such screen, air passages leading into such chamber whereby air may be drawn into such chamber by the action of water emerging from said perforated member, an outlet from said chamber and a screen across said outlet adapted to serve as a baffle whereby the kinetic energy of the water entering said chamber causes the water to admix with air drawn into such chamber and subsequently permits the water mixed with air to pass out through the discharge from said chamber.

7. A device for intimately mixing at least two fluids one of which is under pressure comprising in combination a hollow body having means for connecting said body to a delivery pipe of fluid under pressure, means for dispersing the fluid under pressure, inlets downstream said means and in the wall of said body for the admission of a fluid to be mixed with the fluid under pressure and means downstream the inlets for causing both fluids to mix together before leaving the hollow body, the cross sectional area of the body at the point where said inlets occur and the cross sectional area of the body immediately downstream said inlets being larger than the free streaming section for the fluid under pressure immediately upstream said inlets.

12 8. A device for intimately mixing at least two fluids one of which is under pressure comprising in combination a hollow body having means for connecting said body to a delivery pipe of fluid under pressure, means for dispersing the fluid under pressure, inlets downstream said means and in the wall of said body for the admission of a fluid to be mixed with the fluid under pressure and means downstream the inlets for causing both fluids to mix together before leaving the hollow body, the cross sectional area of the body at the point where said inlets occur and the cross sectional area of the body immediately downstream said inlets being larger than the free streaming section for the fluid under pressure immediately upstream said inlets, the means for causing the fluids to mix together comprising at least two perforated members upstream the escape opening of the hollow body, these members being spaced from each other.

9. A device for intimately mixing at least two fluids one of which is under pressure comprising in combination a hollow body having means for connecting said body to a delivery pipe of fluid under pressure, means for dispersing the fluid under pressure, inlets downstream said means and in the wall of said body for the admission of a fluid to be mixed with the fluid under pressure and means downstream the inlets for causing both fluids to mix together before leaving the hollow body, the cross sectional area of the body at the point where said inlets occur and the cross sectional area of the body immediately downstream said inlets being larger than the free streaming section for the fluid under pressure immediately
13 upstream said inlets, the means for causing the fluids to mix together comprising at least two perforated members upstream said inlets, the means for causing the fluids to mix together comprising at least two perforated members upstream the escape opening of the hollow body, these members being spaced from each other and a reserrement in the interior of the hollow body downstream these perforated members.

10. A device of the type described comprising a chamber having an aperture at an entrance to said chamber, means for delivering liquid under pressure into said chamber in the form of a jet, inlets to admit air into said chamber, baffle means substantially below said aperture and positioned in a plane approximately perpendicular to the path of said jet and a discharge passage from said chamber.

11. A device of the type described comprising a chamber having a plurality of inlet ports for the introduction of fluids into said chamber, one group of said inlet ports having means connected thereto for supplyig fluid under pressure, said inlet ports having a total cross sectional area substantially less than the cross sectional area of the supply means leading to said group of inlet ports thereby to form jets of fluid to increase the velocity of fluid passing through said ports under pressure and another group of said inlet ports adjacent the aforesaid inlet ports to permit fluid not under pressure to be drawn into said chamber by virtue of the increased velocity of the fluid coursing through the aforesaid inlet ports under pressure, *dividing* ~~baffle~~ means positioned in a plane substantially perpendicular to the path of fluid coursing through the group of inlet ports for fluid under pressure, and a discharge port; the cross sectional area of the discharge port being greater than the sum of cross sectional areas of the inlet ports for fluid under pressure but less than the greatest cross sectional area of the chamber.

12. A device of the type described in claim 11 wherein the inlet ports for the introduction of fluids not under pressure comprise a group of ports for introducing one kind of fluid and another group of ports for introducing another kind of fluid.

13. A device of the type described in claim 11 wherein a screen is placed below the baffle means and is substantially parallel thereto further to subdivide fluid bubbles.

14. A device of the type described in claim 11 wherein projections extend partially into the passages formed by the inlet ports for fluid under pressure and below the inlet ports for fluid not under pressure thereby to effect a partial mixing of fluids before the fluids strike the *dividing* baffle means in the chamber.

15. A device of the character described in claim 11 wherein the inlet ports for fluid not under pressure intersect the inlet ports for fluid under pressure.

OATH

State of New York }
County of New York } ss.

Elie Aghnides, being duly sworn, deposes and says: That he is a citizen of the Greek Republic, and a resident of Brussels, Belgium; that he verily believes himself to

be the original, first and sole inventor of the certain new and useful improvements in FLUID MIXING DEVICES, described and claimed in the annexed specification which discloses and claims certain matters derived from an earlier application filed by him on December 4, 1935, Serial No. 52,923, for "Fluid Mixing Devices in Which One of the Fluids Is Under Pressure"; that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or patented or described in any printed publication in the United States of Ameriea, or any foreign country before his invention or discovery thereof; that he does not know and does not believe that the same, except as to matters disclosed in said application Serial Number 52,923, was patented or described in any printed publication in the United States of America, or any foreign country more than two years prior to this application, or in public use or on sale in the United States for more than two years prior to this application; or patented in any country foreign to the United States on an application filed by him or his legal representatives or assigns more than twelve months prior to this application and that no application for patent on said invention has been filed by him or his legal representatives and assigns in any country foreign
16 to the United States, except as follows:

Belgium, December 8, 1934.

and in a number of other foreign countries, the exact list of which is not now available to affiant, all of which applications were filed within one year subsequent to the date of the filing of the said Belgian application, but the information regarding the specific dates thereof is not now available to affiant.

Elie Aghnides

Sworn to and subscribed before me this 14th day of December, 1937.

Mary Horacek
Notary Public.

(Seal)

NOTARY PUBLIC
Queens County No. 844
Queens County Register's No. 4334
Certificate filed in N. Y. Co. Clerk's No. 38
New York County Register's No. 9-H-44
Commission Expires March 30, 1939

Note

Page 2 App. 60 is on Card 8.

18 (Mail Division U. S. Patent Office Dec. 31 1937)

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Filed herewith
(U. S. Patent Office Jan 10 1938 Division XXXII.)

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

In the last rejection of applicant's case, Serial No. 52,923, the Examiner called for the re-writing of the specification. In place of doing this, a continuing application is being filed so as to permit some changes in the drawings and to avoid any issue in regard to new matter.

As regards the claims now submitted, the only reference of importance that previously had been cited is British Patent No. 25,900 of 1909.

Superficially it might appear that this patent shows a structure embodying the principles disclosed by the present applicant, but in fact this is not the case. The essence of applicant's invention is the use of the kinetic energy of the water in the mixing chamber to cause a splashing and splattering which leads to a thorough mixing of the water and the air. An examination of the British
19 patent shows that such an effect will not be had with the structure therein shown. The nozzle e has a very fine aperature at the top and enlarges at the bottom. As a result, the water coming through this nozzle will spread out into a cone. The sleeve f is positioned very close to the nozzle e and is so shaped that the water will tend to move over the face of this sieve with a minimum of splashing action. It is also obvious that the inflow of water must be so controlled that substantially all of the water will be drawn directly through the sieve f and not to be deflected back. If there is more water than will pass through the sieve readily, it would result in filling up the space above this sieve and instead of air being drawn in, the water would back up and go out. This difference is due to the fact that the screen is so arranged that it does not cause an abrupt change in the direction of movement of the water. It is recognized that it might not take many changes to cause the structure of the British patent to operate in a manner similar to that of

applicant, but these changes would demand a recognition of the principles which this applicant has been the first to enunciate and these principles and the changes that would have to be made are in no way suggested by the British patent.

It may aso be noted that the vessel a in this British patent is maintained under vacuum by the action of the very efficient water pump illustrated on the left of the drawing (The pipe g is connected to the unlettered pipe which leads into the sphere in the middle of the apparatus). Because of the vacuum maintained in vessel a air will be positively drawn in through the top of tube b and this will further serve to force water through the sieve f and prevent this water from splashing in the manner which is essential to the operation of applicant's device.

None of the remaining patents are pertinent and therefore they are not discussed in detail.

Of the claims now submitted, Nos. 7, 8 and 9 are substantially similar to former allowed claims 2, 3 and 4 changed only to simplify the form. The remaining claims have been drawn with great care to avoid any objection on the ground of multiplicity of species and to bring out the factors of novelty discussed above.

It is believed that this application is in condition for immediate allowance.

Respectfully submitted,

Dec. 31, 1937

Frank S. Appleman
Attorney for Applicant.

(Application Div. U. S. Patent Office Feb. 17 '30

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Serial No. 182,884
Filed December 31, 1937
Fluid Mixing Devices
(U. S. Patent Office Division XXXII. Feb 19 1938)

Hon. Commissioner of Patents,
Sir:

In the above entitled application, please enter the following amendment:

Page 3, line 9, cancel "splashing effect" and insert—breaking effect on both liquid and air—.

Lines 18 and 19, cancel "it is splattered into droplets and mixed with air" and insert—both water and air are broken up—.

Line 25, cancel "splattering" and insert—breaking—.

Line 28, cancel "from the apertures to splash back" and insert—and air to be broken up—.

Line 29, cancel "to mix with the air".

Cancel line 30, and insert—finely subdivide the air and the water passing through it. For this—.

Page 4, line 4, cancel "somewhat".

Line 6, cancel "bubbles" and insert—and the water—.

After line 9, insert—But an important feature which I have found absolutely necessary and critical in the use of such baffles, and more particularly with the use of screens or perforated plates, is that the dividing or breaking up effect must be considerable, while the resistance offered by the solid material of the baffle must be as low as possible. This can be obtained by reducing the solid parts remaining among the holes of the perforated plate as much as possible in order that the little streams of water issuing from the holes join immediately each other to form a single jet and not a plurality of jets as it occurs by the use of ordinary perforated plates. Due to this very low resistance of the baffles, the air drawn in by the water passes almost entirely through the holes and, as the water forms a single jet, this air remains imprisoned in the form of air bubbles in the column of water.—.

Page 5, line 10, cancel "splatter back into the chamber and".

Line 11, cancel "thoroughly mixed with the air" and insert,—finely divided—.

Please add the following claims:

—*16* 16. A device according to claim 1, in which the baffle means comprises a perforated plate positioned across the discharge from said chamber, this perforated plate being of such construction that it has a very considerable breaking up effect and that the solid parts remaining among the holes are reduced as much as possible in order to offer a resistance as low as possible and to secure the formation of a single jet at the issue of this perforated plate.

17 16. A device according to claim 6, ~~wherein the perforated member is embedded in a peripherical groove of a rubber connector connecting the casing to the faucet.~~

After the case is allowed, please renumber claim 15 as 5, and claim 16 as 7.

Respectfully submitted,
Elie Aghnides
By Frank S. Appleman
Frank S. Appleman, Attorney

February 17, 1938
A/W
23 Div. 32 Room 4086 PRN/k 5

DEPARTMENT OF COMMERCE

United States Patent Office
Washington

Please find below a communication from the EXAMINER in charge of this application.

Conway P. Coe,
Commissioner of Patents
(Mar 21 1938)

Frank S. Appleman,
1331 G St., N. W.,
Washington, D. C.

Applicant: Elie Aghnides
Ser. No. 182,884
Filed Dec. 31, 1937
For Fluid Mixing Devices
As amended Feb. 17, 1938
References:

Felten et al (British) 6,012 A.D. March 12, 1909 261-76 (1 sheet of drawings)
Hoffmann (British 125,809 May 1, 1919 261-76 (specification, 5 pages, drawings, 1 sheet)
Ryles et al (British) 328,924 May 5, 1930 261-76 (specification, 4 pages, drawings, 1 sheet)
Weidmann (British) 25,900 Nov. 9, 1909 261-76 (specification, 2 pages, drawings, 1 sheet)

Claims 1 to 15 are rejected on British patent 25,900 herein as shown at h° a perforated baffle breaks up the mixture of gas and liquid. The liquid nozzle h' also appears to be provided with a transverse screen below it.

The plurality of screens involves no distinction over a single screen.

Claims 1 to 15 are further rejected on Felten et al showing particularly a plurality of sereens for the purpose set forth. No invention is involved in multiplying the liquid ports especially in view of Ryles.

Claims 15 and 16, filed Apr. 17, 1938, are renumbered 16 and 17.

Claim 16 is rejected as functional and indefinite for beyond a mere perforated plate the limitations refer to matters of operation not supported by said plate. The terms are such that no one could pcssibly decide whether they infringed or not. The language "as much as possible", "as low as possible" is especially objectionable. That "single jet is finally formed" is not supported by any of the previously recited structure.

24 Claims 16 and 17 are rejected on the references to claim 1 for like reasons. Claim 17 impositively adds a rubber connector. This, if a part of the alleged invention, must be positively set forth. However, no difference of material will constitute a patentable distinction unless it supplies a novel function not obvious from the known properties of the material.

Claims 1 to 17 are rejected.

PAN

/s/ Fish
Examiner.

Amendment B

25

(U. S. Patent Office Jun 22 1938 Division XXXII
Paper No. Jun 21 1938 Division 89)

In the United States Patent Office

In the application of
Elie Aghnides
Serial No. 182 884
Div. 39
Filed December 31, 1937
Fluid Mixing Devices

Hon. Commissioner of Patents,

Sir;

Replying to the Office Action dated March 21, 1938, please enter the following amendments:

Page 2, line 15, cancel "baffle"
line 17, change "this baffle" into "them"

Page 3, cancel first paragraph and replace by:

"The essential feature of my invention is an arrangement of a dividing means in the path of the liquid emerging from the aperture delivering liquid to the aforesaid chamber, this dividing means being adapted to finely break up the fluids and to imprisons in the liquid air particles forming therein such small bubbles that they remain in suspension in the jet.

It has been suggested to divide the liquid stream under pressure in order to increase the contacting aera between this liquid and the gas; it has also been proposed to divide the stream of liquid and also the gaseous fluid, in order to have a good mixing of both fluids, but in no case, the division has been so fine as to form in the liquid such
26 narrow gaseous bubbles that these latter would remain in suspension in the issuing jet. In the devices suggested until now, the gaseous fluid drawn by the liquid separates immediately at the outlet of the apparatus and no known apparatus has for its object, as this is the case in my invention, the formation of a coherent and "white" jet, this being due to the very fine division of the air and to the formation of a true suspension of a multitude of air bubbles in the water".

Page 3, cancel 6 last lines and insert:
"efficient form of dividing means is a fine screen located at the outlet, and I have found"

Page 4, line 1, cancel "latter reason, I find"
lines 3 to 6, cancel "In that case . . . of the air bubbles" and insert "When more than one of such perforated plates are used, they can be either spaced from each other or superposed, to simplify the construction, in contradistinction with the usually used perforated plates, which must be necessarily spaced from each other to avoid obstruction"

Please insert the new passage entered by the last amendment at line 6, after the following original line 9.

Page 5, last line but 4, before "again" insert:

"This property also is due to the air bubbles in suspension. It must not be confounded with the property of a

jet flowing at high velocity—aerated by an injector or not—which can force a certain amount of air and produce a certain amount of lather. Such lather is formed by large bubbles which explode rapidly. On the other hand, the jet considered has the inconvenience to splash the water"

Page 6, last line, cancel "preferably"

Page 7, cancel lines 4 and 5,

lines 11 and 12, cancel *Here* "More again . . . at 62" and replace by "In this case, a screen 62 is also used in the device"

Pages 8 and 9, cancel last paragraph.

In the claims:

27 Claim 1, cancel lines 7 to 13 and insert:

"means in the path of liquid emerging from said aperture, adapted to finely break up the fluids and to imprison in the liquid air particles forming such small bubbles that they remain in the jet and a passage from said chamber adapted to discharge a jet having a multitude of bubbles in suspension at a velocity substantially less than the"

Claim 5, lines 5 and 6, cancel "and one of . . . of the liquid"

Cancel claims 10, 13 and 15 (now claim 5).

Claim 11, line 14, change "baffle" into "dividing"

Claim 14, last line, change "baffle" into "dividing"

Insert following new claim:

"A structure according to claim 1, in which the outlet of the passage adapted to discharge the jet has a resserrement to help the imprisonment of free air bubbles in the liquid"

Respectfully submitted,
Elie Aghnides
By Frank S. Appleman
Frank S. Appleman, Atty.

June 18, 1938

28

(Letterhead—Department of Commerce)

Please find below a communication from the Examiner in charge of this application.

Conway P. Coe
Commissioner of Patents.

Applicant: Elie Aghnides
Ser. No. 182,884
Filed Dec. 31, 1937
For Fluid Mixing Devices

Frank S. Appleman,
1331 G St., N. W.,
Washington, D. C.

Mailed Jun 23, 1938

The amendment of June 18, 1938 is not a complete response to the office action of Mar. 21, 1938 wherein each of the claims 1 to 17 was rejected. The amendment changes certain of the claims and cancels others but fails entirely to mention claims 6 to 9, 16 and 17 and to point out any reason for reconsidering the rejection of these or the amended claims, or the new claim 18, as required by Rule 68. Also, it is pointed out that claim 15 added by the amendment of Feb. 19 was renumbered as claim 16 and if applicant intends to cancel this rather than original claim 15, proper direction should be given.

Completion of the response is required on or before Sept. 21, 1938 to prevent a holding of abandonment.

PRN.

Fish
Examiner

29

(Stamp—U. S. Patent Office Sep 22 1938
Division XXXII)

(Mail Division Sep 20 1938 U.S. Patent Office
Paper No. 8, Amendment E.)

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Serial No. 182,884 Div. 32
Filed Dec. 31, 1937 Room 4086
For Fluid Mixing Devices
Hon. Commissioner of Patents,

Sir:

Responding to the official letter of June 23, 1938 and also to the office letter of Mar. 21, 1938, the above entitled application is hereby amended as follows:

Cancel all claims now in the application and substitute:

—19. Means for intimately mixing a plurality of fluids including a casing having lateral ports admitting fluid intermediate the ends of said casing, said casing having an open upper end adapted for connection to a source of fluid under pressure, means in said casing above the openings of the lateral ports into the casing and constituting a diaphragm having at least one opening for the passage of fluid entering the upper end of the casing, said casing having its lower end open to form an outlet, and foraminous means extending across said casing between the point of entry of the lateral ports and said outlet.

30 20. In a device of the kind described, a casing structure having lateral ports opening into the casing intermediate its ends, said casing having an outlet opening ats upper end and an outlet opening at its lower and, a foraminous diaphragm extending across the casing between the inlet opening at the upper end and the openings of the lateral ports into the casing, and a second foraminous member extending across said casing below the openings of the lateral ports into the casing.

21. In a device of the kind described, a casing structure having lateral ports opening into the casing intermediate its ends, said casing having an inlet opening at its upper end and an outlet opening at its lower end, a foraminous diaphragm extending across the casing between the inlet opening at the upper end and the openings of the lateral ports into the casing, a second foraminous member extending across said casing below the openings of the lateral ports into the casing, and a third foraminous member spaced above the second foraminous member and below the openings of the lateral ports into the casing.

22. In a device of the kind described, a lower casing member having an outlet at its lower end, an upper casing member of elastic material and having a lower end portion extending downwardly into the top of the lower casing member and provided with channels extending longitudinally of said lower part to form air inlet ports, said upper member having a centrally disposed upwardly opening inlet and further having a chamber surrounding said
31 inlet in port communication with the lower part of the upper member, a foraminous diaphragm extending across said upper member adjacent its lower end, and a

second foraminous diaphragm extending across said lower member adjacent its outlet.

23. In a device of the kind described, a casing including a lower member provided with an axial outlet at its lower end and a peripheral external shoulder at its upper end, an upper internal screw threaded member provided with an internal shoulder at its lower end engaging beneath said external shoulder, a foraminous diaphragm resting on top of the lower member, said lower member having lateral ports below said upper member, and foraminous means extending across the lower member between said ports and said outlet.

24. In a device of the kind described, a casing having an axial opening therethrough, said opening having its upper end enlarged to form an internal shoulder with relation to its lower end, said upper end being internally screw threaded, a foraminous diaphragm resting on said shoulder, a second foraminous diaphragm extending across said opening between the first diaphragm and the lower end of the opening, and lateral ports opening through said casing into the space between said diaphragms.

25. Means for intimately mixing a plurality of fluids including a casing having lateral ports admitting fluid intermediate the ends of said casing, said casing having an open upper end adapted for connection to a source of fluid under pressure, means in said casing above the openings of the lateral ports into the casing and constituting a diaphragm having at least one opening
32 for the passage of fluid entering the upper end of the casing, said casing having its lower end open to form an outlet, and foraminous means extending across said casing between the point of entry of the lateral ports and said outlet, said outlet from said casing being adapted to discharge the mixture at a velocity substantially less than the velocity of liquid entering said inlet.—

REMARKS

In order to avoid any objection that the Official Letters above noted have not been fully answered, it has been deemed best to cancel all claims in the case and substitute the new claims as above inserted.

These claims are believed to be patentable. A careful inspection of the references cited fails to show any structure having a casing with upper and lower diaphragms

and ports leading from the space between the diaphragms to the exterior of the case. Each and every one of the forms of the invention herein shown has exactly this construction and each of the claims brings in this peculiar differentiation from the references. It is submitted that with this type of construction, the inflowing water stream is broken up in such manner that it more readily entrains the air entering through the lateral ports and then as the mixed air and water passes through the lower diaphragm, what may be termed a fine emulsion of the air in the water results.

None of the reference structures provide for this breaking up of the air to mix with the water in the chamber and then the emulsifying of this mixture.

33 In view of the foregoing, it is thought that allowance should be had of these claims.

Respectfully submitted,
Elie Aghnides
By Frank S. Appleman,
Frank S. Appleman, Attorney.

A*G*
Sept. 20, 1938

34

DEPARTMENT OF COMMERCE
United States Patent Office
Washington

Please find below a communication from the Examiner in charge of this application.

Conway P. Coe
Applicant: Elie Aghnides
Filed Dec. 31, 1937
Ser No. 182,884
For Fluid Mixing Devices

Frank S. Appleman,
1331 G St., N. W.,
Washington, D. C.

As amended Sept. 20, 1938.
Reference added:

Aghnides (British) 468,687 July 6, 1937
(specification, 2 pages, drawings, 1 sheet)

This application is found to contain claims to four distinct species of invention of which (I) claim 21 reads

claim is specific to fig. 4, (IV) claim 24 covers figs. 2, on figs. 4 and 5, (II) claim 22 reads only on fig. 1, (III) Claim 23 is specific to fig. 4, (IV) Claim 24 covers figs. 2, 5 and 6. In accordance with Rule 41 election of a single species is required. Claims 19, 20 and 25 appear to be generic to each of the above mentioned species.

Claims 19, 20 and 25 are rejected on Weidmann, British patent 25,900 or Felton as applied in the last office action. Claims 19 and 20 fail to set forth the nature of the fluid media and hence are merely to a few conventional elements having no particular function. As shown, however, the perforated element through which the liquid must pass merely restricts its flow without modifying its condition.

Claims 19, 20 and 25 are further rejected on British patent 468,687 to Aghnides which since filed more than a year prior to this application is a proper reference. The restricted outlet, claim 25, merely retards the flow and has nothing to do with mixing the fluids.

Claims 21 to 24 are rejected for misjoinder of invention.

Claims 1 to 18 are cancelled.

Claims 19 to 25 are rejected.

PRN.

Fish
Examiner.

35

Stamp
U. S. Patent Office
May 10 1939
Division XXXII.

Mail Division
May 8 1939
U. S. Patent Office

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Serial No. 182,884 Div. 32
Filed Dec. 31, 1937 Room 4086
For Fluid Mixing Devices
Hon. Commissioner of Patents,

Sir:

In reply to the Office letter of Nov. 17, 1938, it is to be understood that the specification particularly sets forth that this case is a "continuation in part of my earlier application Serial No. 52,923".

The Examiner has rejected claims 19, 20 and 25 in part because of applicant's said prior application of which this is a continuation. Obviously, therefore, the Examiner cannot properly reject the present application on a British patent which covered the prior application. The Supreme Court has held that an invention dates from the time the inventor completes it in his mind. This is brought out in O'Reilly v. Morse 15 Howe (56 U.S.) 62,109 and in Loom Co. v. Higgins, 105 U.S. 580.

Furthermore, the prior patent issued in England to the present applicant cannot be held an anticipation, since the application now pending is "a continuation in part" of the prior application.

36 Please add the following claims:

26. A device for intimately mixing at least two fluids *one being liquid and the other gases*, one of which is under ressure, comprising in combination a hollow cylindrical body connectable to a delivery pipe of fluid under pressure, means for dividing the stream of fluid under pressure, a passage-way down stream said means in the wall of said body for the admission of fluid to be mixed to the fluid under pressure, and means down stream this passage for obliging both fluids to mix together before leaving the hollow body, the cross section area of the body at the point where said passage is made and the cross section area of the body immediately down stream this passage being both larger than the free streaming section for the fluid under pressure immediately up stream said passage.

27. A device for intimately mixing at least two fluids, *one being liquid and the other gases*, one of which is under pressure, comprising in combination a hollow cylindrical body connectable to a delivery pipe of fluid under pressure, means for dividing the stream of fluid under pressure, a passage-way down stream said means in the wall of said body for the admission of a fluid to be mixed to the fluid under pressure, and means down stream this passage for obliging both fluids to mix together before leaving the hollow body, the cross section area of the body at the point where said passage is made and the cross section area of the body immediately down stream this passage being both larger than the free streaming section for the fluid under pressure immediately up stream said passage, the means for obliging the fluids to

Lax together comprising at least two perforated
37 plates up stream the escape opening of the hollow body, these plates being spaced from each other.

28. A device for intimately mixing at least two fluids, *one being liquid and the other gases*, one of which is under pressure, comprising in combination a hollow cylindrical body connectable to a delivery pipe of fluid under pressure, means for dividing the stream of fluid under pressure, a passage-way down stream said means in the wall of said body for the admission of a fluid to be mixed to the fluid under pressure, and means down stream this passage for obliging both fluids to mix together before leaving the hollow body, the cross section area of the body at the point where said passage is made and the cross section area of the body immediately down stream this passage being both larger than the free streaming section for the fluid under pressure immediately up stream said passage, the means for obliging the fluids to mix together comprising at least two perforated plates up stream the escape opening of the hollow body, these plates being spaced from each other, and a resserrement in the interior of the hollow body down stream these perforated plates.—

The foregoing claims are allowed claims 2, 3 and 4 in applicant's case, Ser. No. 52,923.

Also, please add the following claims:

29. A device for mixing at least a liquid under pressure and air, comprising a hollow body adapted for connection to a source of liquid under pressure, means for dividing the liquid entering said hollow body, a passage
leading into such hollow body for the admission of air
38 through the suction of the liquid, means in the path of liquid emerging from said dividing means for obliging both fluids to mix together, and a passage from said hollow body adapted to discharge the fluids mixed.

30. A device for mixing at least a liquid under pressure and air, comprising a hollow body adapted for connection to a source of liquid under pressure, means comprising a plurality of apertures for dividing the liquid entering said hollow body.

31. A device for mixing at least a liquid under pressure and air, comprising a hollow body adapted for connection to a source of liquid under pressure, means for di-

viding the liquid entering said hollow body, a passage leading into such hollow body for the admission of the air through the suction of the liquid, foraminous means in the path of liquid emerging from said dividing means, for obliging both fluids to mix together, and a passage from said hollow body adapted to discharge the fluids mixed.

32. A device for mixing at least a liquid under pressure and air, comprising a hollow body adapted for connection to a source of liquid under pressure, means for dividing the liquid entering said hollow body, a passage leading into such hollow body for the admission of the air through suction of the liquid, means in the path of liquid emerging from said dividing means for obliging both fluids to mix together, said means comprising at least one perforated member.

39 33. A device for mixing at least a liquid under pressure and air, comprising a hollow body adapted for connection to a source of liquid under pressure, means for dividing the liquid entering said hollow body, a passage leading into such hollow body for the admission of the air through the suction of the liquid, means in the path of liquid emerging from said dividing means, for obliging both fluids to mix together, said means comprising at least two perforated members, said members being spaced from each other.

34. A device for mixing at least a liquid under pressure and air, comprising a hollow body adapatd for connection to a source of liquid under pressure, means for dividing the liquid entering said hollow body, a passage leading into such hollow body for the admission of the air, through the suction of the liquid, means in the path of liquid emerging from said dividing means, for obliging both fluids to mix together, and a passage from said hollow body adapted to discharge the fluids mixed, and a resserrment in the interior of the hollow body downstream said mixing means.

35. A device for mixing at least a liquid under pressure and air, comprising a hollow body adapted for connection to a source of liquid under pressure, means comprising a plurality of apertures for dividing the liquid entering said hollow body, and a resserrement in the interior of the hollow body downstream said mixing means.

40 36. A device of the type described comprising a chamber, an aperture to admit liquid into such cham-

ber, means for delivering to such aperture liquid under pressure, a passage leading into such chamber for the admission of air, means in the path of liquid for obliging both fluids to mix together, and a passage from said chamber adapted to discharge the fluids mixed, the liquid being admitted into such chamber through a plurality of apertures formed in a removable screen.

37. A device of the type described comprising a chamber, an aperture to admit liquid into such chamber, means for delivering to such aperture liquid under pressure, a passage leading into such chamber for the admission of air, means in the path of liquid for obliging both fluids to mix together, and a passage from said chamber adapted to discharge the fluids mixed, the mixing means comprising at least a screen positioned across the discharge from said chamber.

38. A device of the type described comprising a chamber, an aperture to admit liquid into such chamber, means for delivering to such aperture liquid under pressure, a passage leading into such chamber for the admission of air, means in the path of liquid for obliging both fluids to mix together, and a passage from said chamber adapted to discharge the fluids mixed, the liquid being admitted into such chamber through a plurality of apertures formed in a removable screen, and the mixing means comprising at least a screen positioned across the discharge from said chamber.

41 39. In combination with a water faucet, a casing adapted to be attached to such faucet, a member with perforations held across the mouth of such faucet by such casing, a chamber below such screen, air passage leading into such chamber whereby air may be drawn into such chamber by the action of water emerging from said screen, an outlet from said chamber, and a mixing means across said outlet for obliging both means to mix together, and a discharge for the mixed fluids.

40. In combination with a water faucet, a casing adapted to be attached to such faucet, a member with perforations embedded in a peripheral groove of a rubber connector connecting the casing to the faucet, a chamber below such screen, air passage leading into such chamber whereby air may be drawn into such chamber by the action of water emerging from said screen, an outlet from said

chamber and a mixing means across ~~said~~ outlet for obliging both means ~~to mix~~ together, and a discharge for ~~the mixed~~ fluids.

REMARKS

The previously allowed claims to applicant are generic to each of the species cited by the Examiner. Nevertheless, applicant is willing, if the Examiner requires, to limit the species claimed, and only for the purpose of meeting the requirements of the patent practice he agrees to restrict his invention, if necessary, to that class covered in general by Claim 24.

Applicant has also added new claims 29 to 40 for the consideration of the Examiner.

42 It is not thought advisable at the present time to cancel any figures from the drawing, but in the event that the Examiner refuses to admit the new claims, such figures as are not required will be canceled.

Respectfully submitted,
E. Aghnides
By Frank S. Appleman
Frank S. Appleman, Atty.

A•G•L
May 8, 1939

43

(Letterhead—Department of Commerce)

Please find below a communication from the Examiner in charge of this application.

Conway P. Coe
Commissioner of Patents.
Applicant: Elie Aghnides
Ser. No. 182,884
Filed Dec. 31, 1937
For Fluid Mixing Devices
Mailed May 11 1939

Frank S. Appleman,
1331 G. St., N. W.,
Washington, D. C.

The amendment of May 8, 1939 is not a complete response to the Office action of Nov. 17, 1938. Applicant has made no response to the rejection of claims 19, 20 and 25 on the references mentioned in paragraph 2 of that

action. Also applicant has inserted a large number of claims without making the least effort to point out how they avoid the rejection on references or on misjoinder. The former ground of rejection requires that applicant distinguish the subject-matter of the claims from the references. The latter ground requires that applicant point out on which of the several species each of the claims reads. Moreover, the number of claims is on its face unreasonable and it is incumbent on applicant that good reasons be stated therefor.

The amendment must be supplemented to constitute a complete response on or before May 17, 1939.

Fish
Examiner.

PRN

44 #16 72/E

(Mail Division May 16 1939 U. S. Patent Office)
(U. S. Patent Office May 18, 1939 Division XXXII.)

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Serial No. 182,884 Div. 32
Filed Dec. 31, 1937 Room 4086
For Fluid Mixing Devices

AMENDMENT.

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

In the matter of the above application and referring to the Office letter of May 11, 1939 exception is taken to the statement set forth that no response has been made to the rejection of claims 19, 20 and 25 on the references mentioned in paragraph 2 of that action. It is excepted that when claims have been allowed, as in the prior application #52923 this constitutes a bar against the Examiner rejecting on former references.

It is believed that the Examiner, after allowing claims, is within his rights to cite new references.

Nevertheless, the references mentioned in paragraph 2 of the Office action of November 17, 1938 will be considered.

Now neither of these references have been shown by the Examiner to meet the terms of claims 19, 20 and 25. All the Examiner states is that these claims are rejected on Weidmann, British patent 25,900 or Felton as applied in the last Office action. Now this is set forth in paper #9. Let us return therefore to Paper #7. Note that the Examiner has rejected on the references on Weidmann or Felton as applied in the last Office [action. This is set forth in Paper #9. In Paper #7, the Office action does not mention claims 19, 20 or 25 nor does this Office action show any grounds for "rejection of claims 19, 20 and 25 or Weidmann or Felton as applied in the last Office] action" since the last Office action of June 23, 1938 fails to
45 reject the said claims 19, 20 and 25 on any grounds.

In view of the foregoing it is requested that the Examiner state how the claims, 19, 20 and 25, previously allowed, can be rejected on Weidmann or Felten "as applied in the last Office action" since the previous Office action of June 23, 1938 did not apply either of the references now cited in the Office action of November 1., 1938.

In a conversation with the Examiner and Principal Examiner, it is believed that the rejection of claims, 19, 20 and 25, resulted in a conclusion there there was an error in the rejection of these claims on the patent (British) 468,687 to Aghnides., the present inventor.

It is submitted that the invention is not on the separation or combination of gases and liquids. Nevertheless applicant is willing at this time to limit his claims to a device for combining gases and liquids and therefore the following amendment is made.

In Claim 26, Claim 27, and Claim 28, line 2 of each claim after "fluids", insert—one being liquid and the other gases—.

Cancel Claims 29 and 30.

Cancel Claim 32.

Cancel Claims 34 to 40.

Now Claim 35 is based on the same subject matter as the claims allowed in the prior application. Therefore Claim 35 covers all of the forms covered being the previously allowed claims of 19, 20 and 25.

The number of the claims is therefore restricted and cannot be said to be unreasonable.

Now add the following claim:

— 41. In a device of the kind described, a flexible member consisting of an upper part provided with an elastic collar having interior and exterior walls spaced to provide an air section of circular form, said interior wall being adapted to fit on the nozzle forming the outlet of a water supply, a perforated diaphragm extending across the
46 bottom of said elastic member, a cylindrical nozzle fitted on the lower part of said elastic member, a perforated diaphragm located adjacent and within the lower end of said nozzle, and a restricted outlet at the lower end of said nozzle.—

Applicant has now restricted the number of claims and has brought the device down to that shown in Figure 1. Certainly therefore there is nothing in this figure that is illustrated by the references and accordingly allowance is thought due.

It is believed that the foregoing clearly responds to the last Office action.

Respectfully submitted,
E. Aghnides
Frank S. Appleman
By Frank S. Appleman, Atty.

A·G·L
May 16, 1939

47

Department of Commerce
United States Patent Office
Washington

Please find below a communication from the Examiner in charge of this application.

Conway P. Coe
Commissioner of Patents

Frank S. Appleman,
1331 G St., N. W.,
Washington, D. C.

Applicant: Elie Aghnides
Ser. No. 182,884
Filed Dec. 31, 1937
For Fluid Mixing Devices

(Mailed Jul 14 1939)

As amended May 16, 1939.

Applicant having in amendment of May 8, 1939 elected to prosecute claims of the same scope as claim 24, that is,

to figs. 2, 5 and 6, claims 21, 22, 23, 26, 27, 28, 33 and 41 are rejected on the ground that applicant is estopped to prosecute these claims in this application. Claims 21, 23 and 33 read only on fig. 4, while claims 22, 26 to 28 and 41 cover fig. 1 exclusively.

Claims 19, 20 and 25 are rejected on Weidmann or Felten et al as applied in the first and second office actions, papers nos. 5 and 9. Applicant has failed to distinguish these claims from these references. The argument based on the alleged allowance of claims in the original application, of which this is a continuation in part, is of no avail to applicant for the reason that in none of these office actions were claims allowed. Certain claims were at one time referred to as apparently including allowable subject-matter, but then and subsequently all the claims were rejected as indefinite and as so informal as not to permit application of art. It was therefore entirely proper that such claims were rejected in this application and that rejection is accordingly adhered to.

Claims 24 and 31 are rejected on the reference to claim 19 for like reasons. The mode of attaching the device,
48 claim 24, involves no more than ordinary skill and choice, especially as the elements of Felten are secured in a similar way. Claim 31 covers the broad generic construction and such involves no invention over the references.

Claims 1 to 18, 29, 30, 32, and 34 to 40 are cancelled.

Claims 19 to 28, 31, 33 and 41 are FINALLY rejected.

Fish
Examiner

PRN

49

(U. S. Patent Office Dec 12 1939 Division XXXII)
(Mail Division Dec 12 1939 U. S. Patent Office)

IN THE UNITED STATES PATENT OFFICE

In the application of
Elie Aghnides
Serial No. 182,884 Div. 32
Filed Dec. 31, 1937 Room 4086
For Fluid Mixing Devices
Hon. Commissioner of Patents,

Sir:

Responding to the official letter of July 14, 1939, the above entitled application is hereby amended as follows.

Cancel the claims and substitute:

—42. In a device for producing a jet of water containing air bubbles, by the entrainment and mixture of the air to the water flowing under pressure, a casing having a passage therethrough, the inlet end of which is adapted for connection to a source of water under pressure and the outlet end for discharging the air-water mixture, an upstream and a downstream foraminous part extending across the passage and spaced from each other, the said casing having an air admitting opening between said foraminous parts.

43. The device of claim 42 wherein the upstream foraminous part is a sieve and the downstream foraminous part is another sieve, the aggregate cross sectional area of the foramina of the latter being greater than the aggregate cross sectional area of the foramina of the upstream foraminous part.

44. The device of claim 42 wherein the downstream foraminous part is a fine wire mesh screen.

45. The device of claim 42 wherein the downstream foraminous part is a plurality of wire mesh screens spaced from each other.

46. The device of claim 42 wherein the foraminous parts are removable.

47. The device of claim 42 wherein the interior of the casing is contracted in its cross section between the downstream foraminous part and the said outlet end.

48. The device of claim 42 wherein the interior of the casing continues beyond the downstream foraminous part and terminates in a tubular portion extending from the said downstream foraminous part to said outlet end.

49. The device of claim 42 wherein there are a plurality of the air admitting openings extending from the inlet end of the casing toward the outlet end to open laterally circumferentially spaced intervals between the upstream and the downstream foraminous parts.

50. The device of claim 42 wherein there are a plurality of the air admitting openings extending radially through the casing wall at circumferentially spaced intervals between the upstream and the downstream foraminous parts.

51. The device of claim 42 wherein the inlet end is adapted to be screwed to a faucet and the removable upstream foraminous screen is held in position across the mouth of such faucet by such screwing of the casing.

51 52. In a device for producing a jet of water containing air bubbles, a casing having a passage therethrough, the inlet end of which is adapted for connection to a source of water under pressure and the outlet end for discharging the air and water mixture, an upstream and a downstream foraminous part extending across the passage and spaced from each other, the casing having an air admitting opening between said foraminous parts, and in which for a known flow of water under pressure through the upstream foraminous part, the retardation of the flow of water under pressure by the downstream foraminous part effects the mixing of air and water, the mixture leaving the casing in the form of a coherent stream.

53. In a device for forming a coherent stream of mixed air and water, a casing having a passage therethrough, the inlet end of which is adapted for connection to a source of water under pressure and the outlet end for discharging the air and water mixture, an upstream and a downstream foraminous part extending across the passage in spaced relation to each other, the said casing having air admitting opening between the said foraminous parts, the foramina in the said elements being so proportioned and seated as to effect the entrainment and mixing of the air with the water, the mixture leaving the casing in the form of a coherent stream.—

REMARKS

Claims 52 and 53 are of a type somewhat on the order of the gekennzeichnet claim. Authority for claims of this kind is found in the citations under Section 5604 of "Patent Claim Drafting" by Stringham.

Claim 53 has an introductory statement as to the formation of the "coherent stream" and then recites
52 the elements and the relation of parts necessary in applicant's invention to produce this result.

Claim 52 is characterized by the inclusion of related parts for producing the coherent stream.

Plaintiff's Exhibit 15.

2 App. 38

Fig. 8

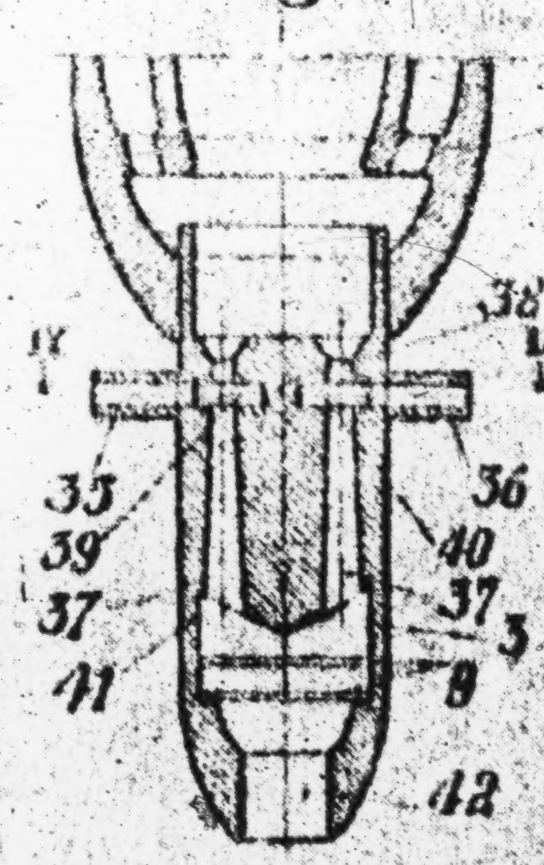
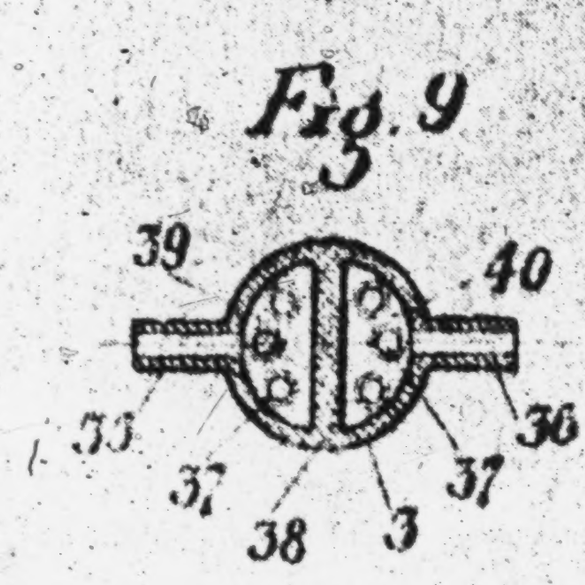


Fig. 9



518

PLAINTIFF'S EXHIBIT NO. 16 2 App. 49

PATENTED BY
TURN TO RECORD FROM
NUMBER (Sec.) of 19 37

1937

182884
DIV. 3 4 32
4 0

PATENT NO. 2210849

DATED AUG 6 1940

(EX'R'S BOOK) 1106
28

Name ELIE AGHNIDES

To:

of ~~BRUSSELS~~, [illegible]

State of ~~BELGIUM~~, [illegible]

Invention FLUID MIXING DEVICES

ORIGINAL	RENEWED
APPLICATION FILED COMPLETE DEC 31, 1937	
PARTS OF APPLICATION FILED: *Petition, Specification, Oath, First Fee $30* / *1 sheets Drawings,* — DEC 31, 1937	
Examined and passed for Issue JUN 25 1940, 19	*Reexam'd and passed for Issue*, 19
Exr. Div. [illegible]	*Exr. Div.*
Notice of Allowance JUN 29 1940, 19	*Notice of Allowance*, 19
Final Fee $30 July 11, 1940; 19	*Final Fee*, 19
By Commissioner	*By Commissioner.*

Division of Apps., No.

Attorney FRANK S. APPLEMAN 1331 G ST N.W. CITY

(Ex Office) John Boyle, Jr. 801 Washington L. & T. Bldg. City

Address

Associate Attorney

No. of Claims Allowed 5 *Print Claims* 1 *in O. G. Class* 261-26

Title as Allowed Fluid Mixing Device

BELGIUM DEC 8, 1934 E.C.

2 App. 60

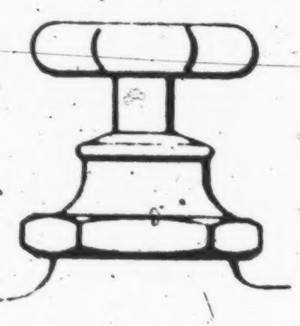
PLAINTIFF'S EXHIBIT NO. 16

17

182884

Print

Fig. 1.



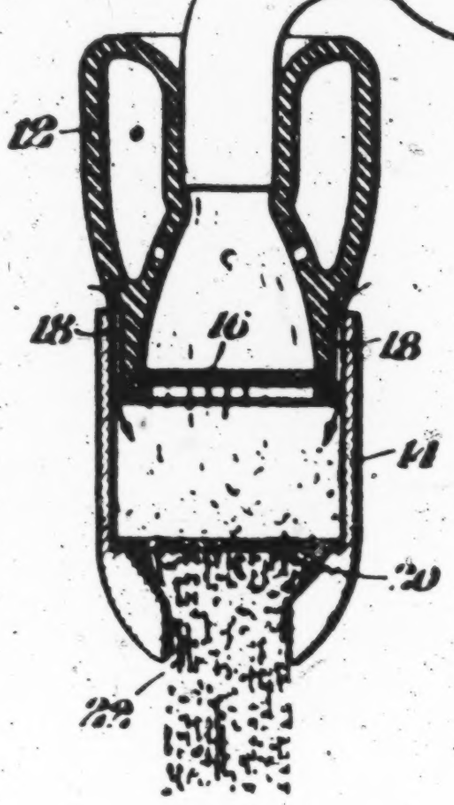


Fig. 2.

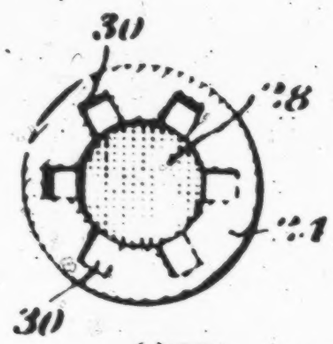


Fig. 1.

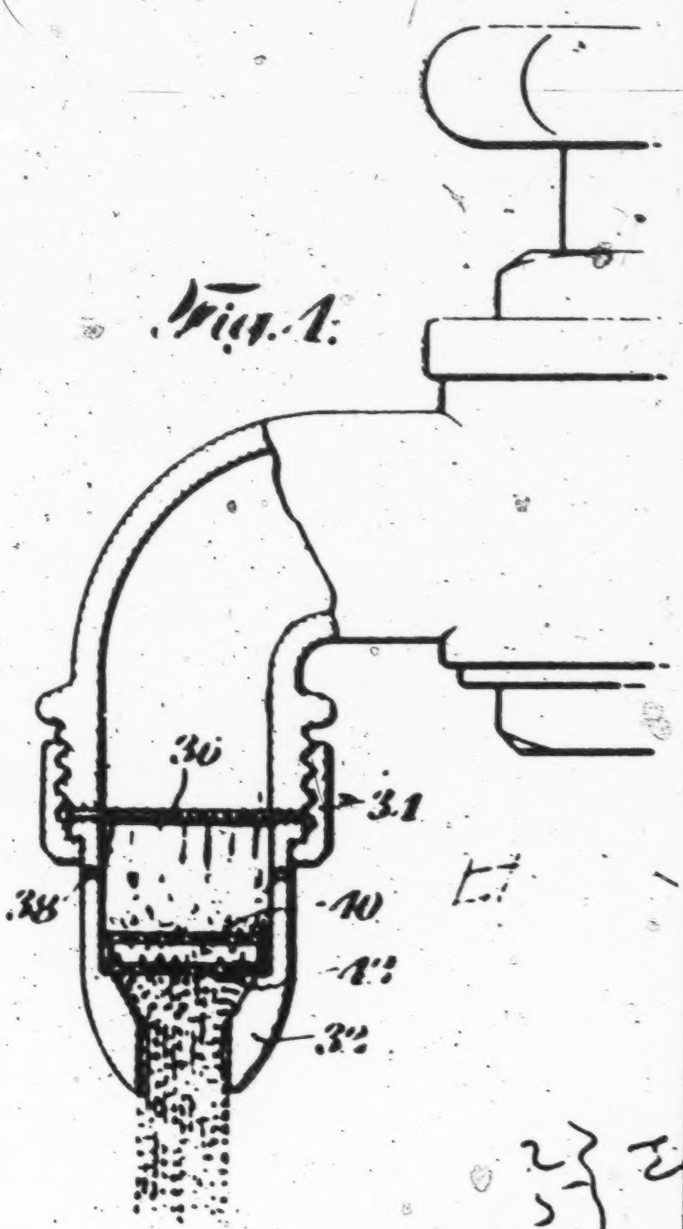


Fig. 3.

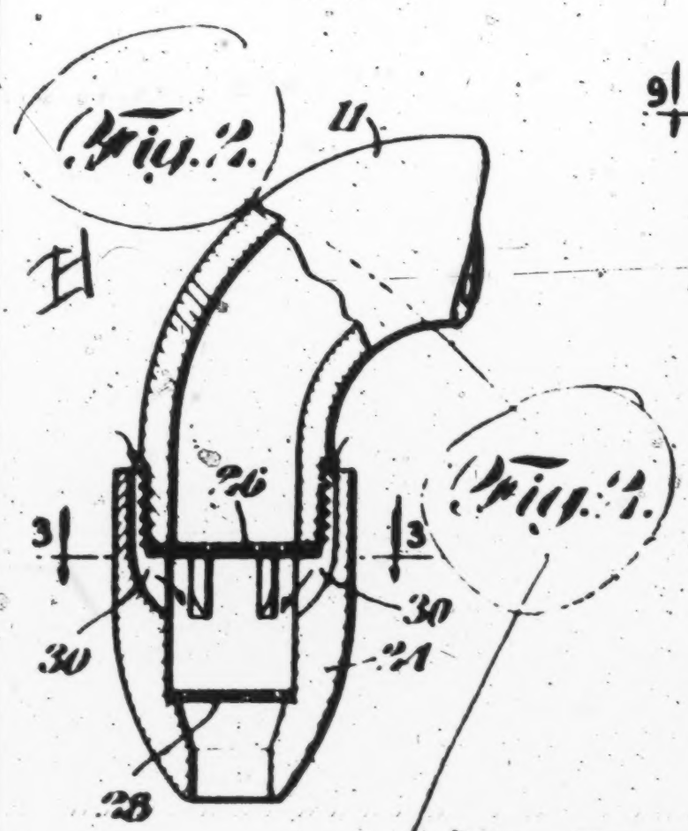


Fig. 4.

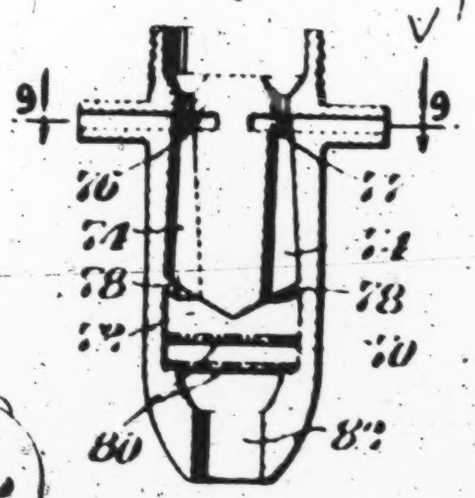


Fig. 5.

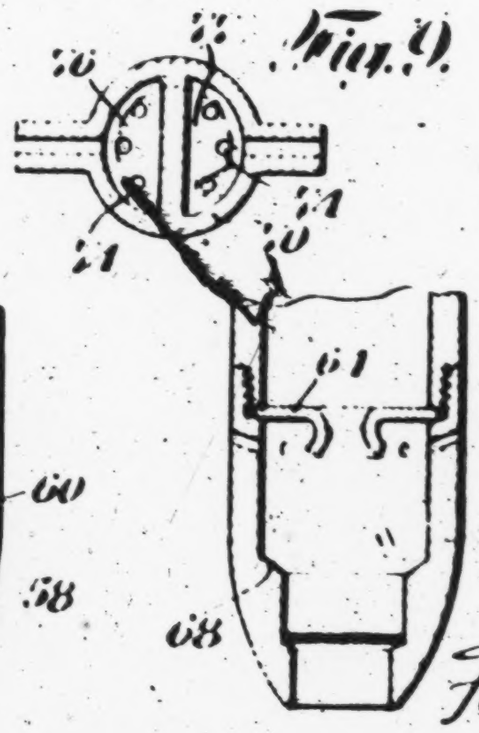


Fig. 6.

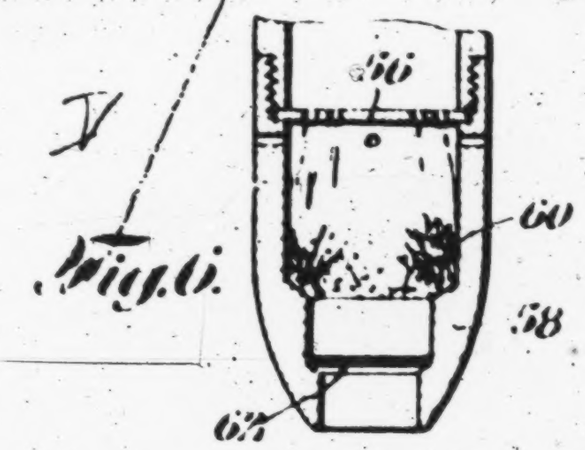
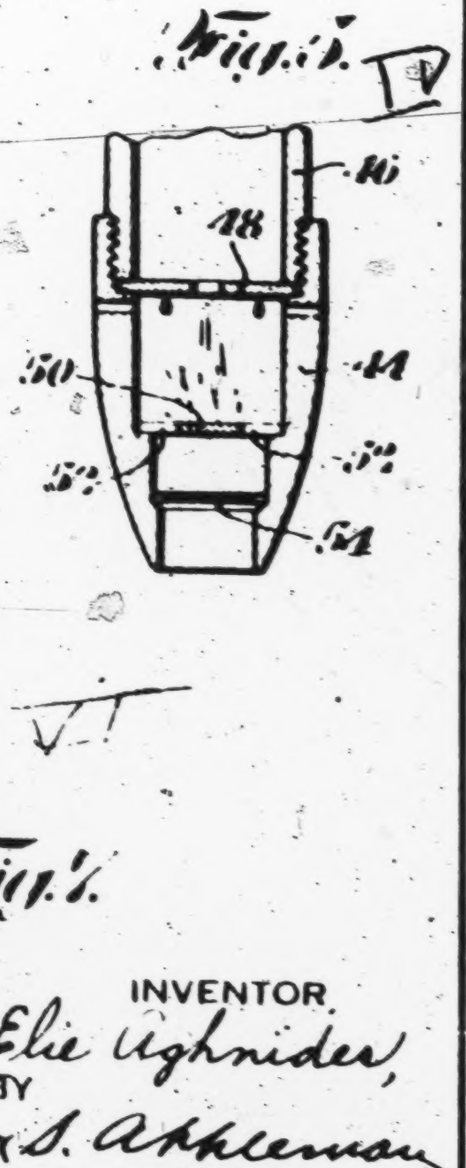


Fig. 7.

Fig. 8.



INVENTOR
Elie Aghnides,
BY
Frank S. Ackerman
ATTORNEY

Plaintiff's Exhibit 16 2 App. 137

COMMISSIONER
JUL 26 1950
OF PATENTS

Form 789

UNITED STATES DISTRICT COURT
District Court of the United States
DISTRICT OF NORTHERN ILLINOIS - EASTERN DIVISION

HONORABLE COMMISSIONER OF PATENTS,
Washington, D. C.

SIR:

In compliance with the Act of Eebruary 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 19th day of July, 1950 in this court an action, suit, or proceeding No. 50 C 1022, entitled:

Name ELIE P. AGHNIDES, Plaintiff,
Address 46 West 54th Street, New York 19, N.Y.

versus

Name ORLOFF W. HOLDEN and MARGUERITE HOLDEN, a corp., d/b/a KNICKERBOCKER RUBBER COMPANY, Defendant,
Address 6101 S. May Street, Chicago 21, Illinois

brought upon the following patents:

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,210,846	August 6, 1940	Elie P. Aghnides
2			
3			
4			
5			

In the above-entitled case, on the day of 19..., the following patents have been included by answer, cross bill, or other pleading:

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree entered:

.....

.....

IN WITNESS WHEREOF I have affixed my hand this 24th day of July, 1950, at Chicago, Illinois.

ROY H. JOHNSON
Clerk of said Court

By .....

2 App. 138 Plaintiff's Exhibit 16

FORM 730

UNITED STATES DISTRICT COURT

~~District Court of the United States~~

DISTRICT OF NORTHERN ILLINOIS - EASTERN DIVISION

COMMISSIONER

SEP 19 1950

OF PATENTS

HONORABLE COMMISSIONER OF PATENTS,
Washington, D. C.

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 17th day of August, 1950, in this court an action, suit, or proceeding No. 50 C 1178, entitled:

Name ELIE P. AGHNIDES, Plaintiff,

Address 46 W. 54th St., N.Y. 19, N.Y.

versus

Name JOSEPH J. GOODRIE and WRIGHTWAY ENGINEERING COMPANY, Defendant,

Address 1053 E. 43rd St., Chicago, Ill; 1053 E. 43rd St., Chicago, Ill.

brought upon the following patents:

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,210,846	August 6, 1940	Elie P. Aghnides
2			
3			
4			
5			

In the above-entitled case, on the ..... day of ....., 193 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree issued:

.....

.....

IN WITNESS WHEREOF I have affixed my hand this 18th day of September, 1950 at Chicago, Illinois

ROY H. OHLSON

By

U. S. GOVERNMENT PRINTING OFFICE 7—2016

Form 789

District Court of the United States

DISTRICT OF Middle District of North Carolina

COMMISS...

MAR - 2 1953

OF P...

HONORABLE COMMISSIONER OF PATENTS,
Washington, D. C.

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 3rd day of March, 1953, ~~1953~~, in this court an action, suit, or proceeding No. 728 G., entitled:

Name Elie P. Aghnides, Plaintiff,

Address 46 West 54th Street, New York 19, New York

versus

Name The Meyer's Company, Defendant,

Address Greensboro, North Carolina

brought upon the following patents:

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,210,846	Aug. 6, 1940	Elie P. Aghnides
2	2,316,832	April 20, 1943	Elie P. Aghnides
3			
4			
5			

In the above-entitled case, on the ..... day of ....., 193 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree issued:

IN WITNESS WHEREOF I have affixed my hand this 3rd day of March, 1953, ~~1953~~, at Greensboro, North Carolina

Henry Reynolds
Clerk of said Court.

By [signature]
Deputy Clerk

U. S. GOVERNMENT PRINTING OFFICE 2016

 Plaintiff's Exhibit 16

FORM 100

UNITED STATES DISTRICT COURT
District Court of the United States

DISTRICT OF NORTHERN ILLINOIS — EASTERN DIVISION

COMMISSIONER

MAR 2[illegible] 1953

OF PATENTS

HONORABLE COMMISSIONER OF PATENTS,
Washington, D. C.

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 27th day of August, 1950, in this court an action, suit, or proceeding No. 50 C 1178, entitled:

Name Elio P. Aghnides, Plaintiff,

Address 46 W. 58th St., N.Y., 19, N.Y.

versus

Name Joseph J. Goodell and Wrightway Engineering Company, Defendant,

Address 1053 E. 43rd St., Chicago, Ill; 1053 E. 43rd St., Chicago, Ill.

brought upon the following patents:

PATENT NO.	DATE OF PATENT	PATENTEE
1 2,210,046	August 6, 1940	Elio P. Aghnides
2		
3		
4		
5		

In the above-entitled case, on the ..... day of ....., 193 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

PATENT NO.	DATE OF PATENT	PATENTEE
1		
2		
3		
4		
5		

In the above-entitled case the following decision has been rendered or decree issued: Complaint of plaintiff dismissed for want of equity. Defendants' Counterclaim for Declaratory Judgment that the Aghnides patent No. 2,210,046 is invalid and void, is sustained. That defendants recover their costs to be taxed in this action and that execution issue therefor.

IN WITNESS WHEREOF I have affixed my hand this 5th day of March, 1953, 193 , at Chicago, Ill.

Roy H. Ellwood
Clerk of said Court.

By Ezell Bartholomew
Deputy Clerk

U. S. GOVERNMENT PRINTING OFFICE 7—3016

182884-117

Plaintiff's Exhibit 16 2 App. 141

AO Form 120

United States District Court
for the
Southern District of New York

In Re Patents
COMMISSIONER
1953
OF PATENTS

COMMISSIONER OF PATENTS,
Washington 25, D. C.

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392; 35 USC 70), you are advised that there was filed on the 3rd day of June, 1953, in this court an action, suit, or proceeding No. Civ. 85-272, entitled:

Name Marshall Metal Products Inc. (New York), Plaintiff,

Address The Meyer's Company (North Carolina)

versus

Name Elio P. Aghnides, Defendant,

Address New York

brought upon the following patents:

PATENT NO.	DATE OF PATENT	PATENTEE
1 2,210,846	Aug. 6, 1940	To deft.
2 2,316,832	Apr. 20,1943	" "
3		
4		
5		

In the above-entitled case, on the ..... day of ....., 19 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

PATENT NO.	DATE OF PATENT	PATENTEE
1		
2		
3		
4		
5		

In the above-entitled case the following decision has been rendered or decree issued:

.....

.....

.....,
Clerk.

Date June 3rd, 19 53. By .....,
Deputy Clerk.

Plaintiff's Exhibit 16

FORM 70

UNITED STATES DISTRICT COURT

District Court of the United States

DISTRICT OF NORTHERN ILLINOIS - EASTERN DIVISION

COMMISSIONER OF PATENTS

APR 20 1954

HONORABLE COMMISSIONER OF PATENTS,
Washington, D. C.

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 17th day of August, 1950, in this court an action, suit, or proceeding No. 50 C 1178, entitled:

Name ELIE P. AGHNIDES, Plaintiff,

Address 46 W. 54th St., N.Y. 19, N.Y.

versus

Name JOSEPH J. GOODRIE and WRIGHTWAY ENGINEERING COMPANY, Defendant,

Address 1053 E. 43rd St., Chicago, Ill; 1053 E. 43rd St., Chicago, Ill.

brought upon the following patents:

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,210,846	August 6, 1940	Elie P. Aghnides
2			
3			
4			
5			

In the above-entitled case, on the day of , 193 , the following patents have been included by (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree issued: /Complaint of plaintiff dismissed for want of equity. Defendants' Counterclaim for Declaratory Judgment that the Aghnides patent No. 2,210,846 is invalid and void, is sustained. That defendants recover their costs to be taxed in this action and that execution issue therefor.

IN WITNESS WHEREOF I have affixed my hand this 16th. day of April 1954, 193 , at Chicago Ill inois.

Roy W. Johnson
Clerk of said Court.

By , Deputy Clerk

U. S. GOVERNMENT PRINTING OFFICE 7--2016

* Notice of appeal to U.S.C.A. filed 5-7-53
* Filed Mandate from U.S.C.A. Judgment entered March 30, 1954 A. D.

Form 789

District Court of the United States

DISTRICT OF [redacted]

HONORABLE COMMISSIONER OF PATENTS,
Washington, D. C.

SOLICITOR

AUG 5 - 1954

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 6th day of July U. S. PATENT OFFICE, 19[redacted], in this court an action, suit, or proceeding No. 857-G, entitled:

Name [redacted] Aghnides, Plaintiff,

Address New York 19, N. Y.

versus

Name [redacted] & Co., Defendant,

Address Green[redacted], N. C.

brought upon the following patents:

B

	PATENT NO.	DATE OF PATENT	PATENTEE
1	[redacted]	August [redacted], 1940	[redacted]
2	[redacted]	[redacted] 8, [redacted]43	[redacted]
3			
4			
5			

In the above-entitled case, on the day of , 193 , the following patents have been included by (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree issued:

IN WITNESS WHEREOF I have affixed my hand this [redacted] day of

[redacted], 19[redacted] at [redacted]

[redacted] 7 2016

Clerk of said Court.

Billy W. Herrington

By

At Section 5602 of the Stringham authority, it is stated that no particular form is required for a patent claim and in support thereof, Jepson 242 O.G. 525 and Markush 340 O.G. 839 were cited as authority, and in Brown *vs.* Gill 90 U.S. 181 cited under Section 5602, it was held that no particular form of words is necessary if the meaning is clear, so that these claims 52 and 53, it is submitted, should be favorably considered. These two claims and claim 42 are not different to any marked degree, yet it has been held that applicant is entitled to couch his claims in different verbiage so long as there is not a multiplicity of claims. Ex parte Clark 497 O.G. 549 sanctions writing claims to the same invention in different phraseology and of course the types of these claims are somewhat different, one from the other, so that they may be considered under the decisions cited. However, if these three claims in different verbiage were considered as being a multiplicity of claims, it is hoped that claim 42 shall be favorably considered, the meaning being clear and the claims 43-51 being in order for favorable consideration also. Claims 43-51 which depend from claim 42 can also be easily considered after the merits of claims 52 and 53 are determined.

It is believed that claim 42 is of the type recognized as proper, the inclusion of "by the entrainment and mixture of the air to the water flowing under pressure" making clear the structural relations of parts, the characteristics of which are well known under the name of
53 Venturi tube or Injector effect. The inclusion of the above phrase in claim 42 complies, therefore, with the requirement referred to by the Examiner, making the structural differences and combination of claim 42 sufficiently definite, although authority is found for the allowance of claims including functional statements. Such claims are referred to at Section 5625 of Stringham's "Patent Claim Drafting" citing as authority Telephone Cases 126 U.S. 1, 43 O.G. 377; Bush v. Jones, 184 U.S. 598. The Bush case was cited by Stringham because it was referred to by the Assistant Commissioner Clay in his decision on the Jepson type of claim. Claims have not always been sustained by Courts upon the basis of introductory expression, but if there is a chance that such claim may be sustained, it is suggested as justification for allowance.

The Court of Customs and Patent Appeals in their decision in re: Kamrach 65 F. 2d, 298 reversed the unfavorable decision of the Board of Appeals and said:

"Appellant is entitled to have any doubt resolved in his favor."

The same Court in their decision in re: Sunderland 68 F. 2d, 318 after saying:

"In view of the familiar rule that applicant for patent is entitled to have any genuine doubt which may exist resolved in his favor."

stated further:

"We are of the opinion that he is entitled to have the rule as to doubt applied."

The same Court in their still more recent decision in re: George 68 F. 2d, 571 reversed the unfavorable decision of the Board and said:

"Applying the rule that doubt should be resolved in favor of the applicant, we conclude that all of said claims here on appeal should be allowed."

54 There is any amount of authority which can be cited to the effect that if doubt exists as to patentability or the Examiner has any doubt as to whether the claim would be held invalid, the claim should be allowed and the applicant given his day in Court.

The claims are submitted with the hope that the final rejection will be waived and that the claims can be considered allowable in view of the foregoing remarks, but in the event they are not considered allowable, request is made that they be admitted for the purpose of appeal.

The claims are presented having in mind the prior art of record, an English patent No. 7005 of 1913 which was referred to by the Examiner at an interview and a demonstration of the invention, and at which time the reference structures depended upon by the Examiner were also demonstrated. As then clearly shown applicant's device produces an intimate mixture of air and water which is discharged as a coherent stream, full of air bubbles. The reference constructions fail to do this.

Applicant's device mixes two fluids.

Reference construction atomizes one liquid.

In the reference construction, the apertures 10 are not for aspirating air and their function must not be essential since they are not even mentioned in the claims

and are not necessary for the atomizing function. This is a structural difference between applicant's and the reference's claims.

Applicant's device is in combination with the Venturi tube principle, while reference constructions are not, because the jets issuing from the nozzles 3 and passing through the screens 6 are too distant from each other. As a consequence, air enters the casing 1 through the
55 screen 6; the jets from nozzles 3 do not join each other. Moreover, the result claimed in the reference (viz:, the formation of spray or mist-like jet floating in the air) is not due to the plurality of nozzles 3.

In lines 5 to 10, page 3 of the reference, it is stated that the volume of the spray may be increased either by increasing the size of the nozzle 3 or by using as many small nozzles as may be necessary. The use of a plurality of nozzles is therefore merely to increase the volume of the spray and not to improve the atomization, (lines 5 to 6, page 3). In fact, the device must work even better with a single nozzle 3 since evidently when two or more nozzles are used, even as shown in the drawing of the reference, when they are substantially spaced from each other to avoid the Venturi effect, the diverging atomized jets issuing from the screen 6 intermix and tend to render the droplets bigger.

In applicant's case, the division of the water under pressure:

a) increases the surface of contact between air and water, which means a better aeration and more air-bubbles in the jet;

b) distributes the pressure of water and results in a substantially thick stream flowing softly;

c) helps the imprisonment of the air drawn in in the mass of liquid.

The statement in each of applicant's claims that air is drawn in and passes through the casing with the water discharged, differentiates structurally applicant's device from the reference constructions inasmuch as the applicant's device embodies the structural requirements of the Venturi principle, while the reference construction does not, since the latter not only does not produce the
56 Venturi effect but it is so constructed as to avoid it. Since this novel combination produces a highly im-

proved mixing of the air and water, allowance of the claims is believed proper.

As to the aforementioned English patent, the point was made at the interview that the paint distributor of that patent teaches the spraying of paint in a mist-like state. It would be inappropriate for such a paint distributing instrumentality to mix the spraying paint with air to form air bubbles such as are produced in applicant's invention, on account of the fact that the air bubbles would resist the even coating of the sprayed surface.

Now, after the teachings of this invention and a modification of the device of the English patent made in accordance with the teachings of the invention, the practice does not sanction and the decisions do not justify the conclusion that the English patent is a reference which can operate to limit the invention. All claims include a casing having an air-admitting means (not a scavenging opening such as is in the English patent) for if the openings are air-admitting means, they would resist scavenging function. The claims also recite that there is an entrainment of air and performance of this injector effect cannot be obtained without a relation of parts or elements constituting the invention.

The demonstration made in the presence of the Examiner showed that the entrained air with the water produced a "soft" stream which did not splash and which, when caused to flow in a container having soap, produced suds having minute bubbles which did not quickly lose their shape and that an effective suds was maintained intimately mixed with and on the surface of the water.

57 Now what of the prior art? Is there anything in it that produces the result of applicant's invention and is the device of the English patent pertinent to give the effect without changes made after the teachings of this invention? Certainly the English patent, which is nearest of the prior art in structure to applicant's invention, could not be operated to achieve applicant's result without using the openings 10 as air inlets rather than as exit openings. Demonstration before the Examiner has proved that the openings 10 could effectively be closed with a rubber band and not affect the functioning of the reference construction, thus conclusively proving that the openings 10 are not intended to allow the suction of the air which is the very purpose in the applicant's device. The Exam-

iner will recall that when the rubber band effectively closed the air entrance in the applicant's device, the device simply would not operate.

The jets 3 in the reference construction are so set as to deliver individual streams to and through the screens 6 and would have to be modified in view of applicant's invention to produce anything like the function of applicant's invention.

There are decisions which support applicant's contention that a device which was not intended to perform the function of the invention claimed and which did not contain a description of operation as functioned by an invention claimed is not a relevant or competent anticipation.

At page 760 of the Journal of the Patent Office Society of 1934, fourth paragraph, there is a statement as to the proper treatment of an invention and a reference as follows, viz:

58 "Things which cannot be combined in fact, without material alteration, should not be combined in law to anticipate a combination. And it must not be forgotten that knowledge after the fact should be excluded in constructing a mental anticipation."

It is believed sound reasoning to state that it is only "after the fact of this invention" that any conception of the use of the device of the English patent could be visualized as having inherent qualities to perform the function of the invention even after material alterations.

The claims are therefore submitted with the hope that the application will be dealt with in the light of the article by John H. Ruckman beginning at page 757 of the cited Journal.

Respectfully submitted,
E. Aghnides
By Frank S. Appleman
Frank S. Appleman, Atty.

FSA:LBL
Dec. 12, 1939

59

(Letterhead—Department of Commerce)

Please find below a communication from the EXAMINER in charge of this application.

Conway P. Coe
Commissioner of Patents.

Frank S. Appleman
1331 G Street N.W.
Washington, D. C.

Applicant: Elie Aghnides
Ser. No. 182,884
Filed Dec. 31, 1937
For Fluid Mixing Devices

(Mailed Dec. 20 1939)

Responsive to amendment filed Dec. 12, 1939.

The proposed amendment of Dec. 12, 1939, is refused entry for the reason that it does not put the application in allowable condition after Final Rejection.

The number of claims filed is held unreasonable in view of simplicity of the subject matter and in view of the prior art. The nine claims depending upon claim 42 either recite elements necessary to make claim 42 complete or immaterial structural details such as that the "forminous parts are removable". The claims are, therefore, subject to rejection on the ground of multiplicity.

Claim 42 reads on the British patent 7,005 over which there is no difference in structure recited. Claim 43 calls for an upstream sieve which, if interpreted to cover the perforated plates disclosed, also is indistinguishable from the perforated plate 2 of the British patent. Claim 44 recites the downstream wire mesh screen which the British patent possesses. Claim 45 merely pluralizes its screens and claim 46 makes the screen removable, neither of which distinguishes. In claim 45 a part cannot consist of a plurality of spaced screens. Claim 47 includes the contracted downstream end not of itself sufficient to patentably distinguish. Claim 48 merely extends the casing beyond the screen. Claims 49 and 50 recite the plurality of air openings which the British patent shows. The
60 attachment feature claim 51 involves no more than ordinary skill and choice. Claims 52 and 53 do not recite any structure to distinguish from the British pat-

ent but rely wholly upon a statement of function. The structure whereby the alleged difference in operation is obtained must be recited by the claims. Lines 8-12 of claim 52 are vague and indefinite, and it is not clear that retardation by the downstream screen has anything to do with the matter. The last five lines of claim 53 contain a statement of a desired result but no teaching of how it can be obtained.

A proper response is required on or before Jan. 14, 1940.

PRN

Fish
Examiner.

61 (Application Div. U.S. Patent Office Jan 12 '40)

IN THE UNITED STATES PATENT OFFICE

(U. S. Patent Office Jan 13 1940 Division XXXII.)

In the application of
Elie Aghnides
Serial No. 182,884
Filed Dec. 31, 1937
Fluid Mixing Devices.

Div. 32
Room 4086.

Hon. Commissioner of Patents,

Sir:

Cancel all of the claims and substitute therefor the following:

1 ~~54~~. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphgram at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for timely breaking up the water and for offering sufficient resistance for thoroughly mixing it with

air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

2 55. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the cham-
62 ber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and means for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

3 56. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet, the resistance offered by the said means and the cross sectional area of the orifice being proportioned to effect the entrainment and mixing of the air with water before their discharge from the said outlet end.

4 57. The device of claim 1 54 in which the said means comprises a screen at the discharge end of the chamber, the openings in which are sufficiently close together so that the streams of aerated water issuing therefrom im-

mediately join each other to form a single jet.

63 5 58. The device of claim 1 54 in which the said means comprises superposed screens, the screen at the discharge end of the chamber having aperatures which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

Remarks.

The object in this case is to secure a jet of water that is so full of minute bubbles of air in suspension that it has a whitish color and is soft to the touch. This is brought about by two distinct steps. First, the water in the chamber is thoroughly aerated so that it will have, insofar as possible, the maximum quantity of air. This end is accomplished by the high kinetic energy of the jet as it is injected into the chamber and the resistance that it meets from obstructions such as the screens at the outlet end. This results in finely breaking up the water and thoroughly mixing it with air. Second, having secured the aerated mixture it is then withdrawn from the chamber in the form of a coherent jet with small air bubbles disseminated throughout the jet. The preferred means for accomplishing this end is a screen at the discharge end of the chamber of sufficient resistance to the flow of the stream and in which the openings are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet. The reason that this latter happens is because the zone of aspiration of each little stream cuts or is at least tangent with the suction zone of the neighboring stream.

The Examiner relies principally upon the British patent No. 7005 of 1913 but this patent does not produce a coherent jet but instead it forms a spray. While there is some pictorial resemblance between the device of the British patent and applicant's device, it is quite apparent that their mode of operation must for some reason be entirely different, otherwise one would not produce a spray and the other produce a coherent jet. In order

64 to produce a spray no air is necessary. All that is required is a means for subdividing finely the stream of water outside of the device. It is stated in the British

patent, page 2, lines 25 to 27 that there is a nozzle employed "so as to cause a free and substantially unbroken jet of liquid to impinge upon a stationary foraminous screen of the nature of wire fabric". As this unbroken jet of liquid hits the screen in the British patent, due to the fact that there is insufficient resistance in the screen, the jet of water is merely subdivided and passes into the atmosphere in the form of a mist but without any entrainment of air in the stream of water. The reason why there is no entrainment of air is because the combined areas of the nozzles at the upstream end are relatively small, as compared with the area of the discharge outlet, and the relative resistance to such a fine high velocity stream is low.

In order to make the British patent function in the same way as in applicant's device, one of two things would have to be done. The resistance of the screen at the outlet end would have to be increased to such a point that it would entrain the air inside of the chamber. One way of accomplishing this increased resistance would be by using a plurality of screens superposed on each other. The other way would be by increasing the total orifice area at the upstream end and from whence it impinges on the screen. By so doing the water instead of merely passing through the screen without entrainment of the air, floods the face of the screen and entrains the air in it producing the jet effect. It is apparent that until air is mixed with the water by the screen and as it leaves the screen, there will be no induction of air through the air ports. Only so much air is drawn through the air ports as leaves at the discharge end of the device mixed with the water and in the British patent this is nil. Accordingly, if the proportions of the British patent are not such as to entrain the air through the screen, there will be no air induced through the aperatures 10. On the other hand, if a sufficient amount of air is entrained through the screen in the British patent, then it will not discharge in the form of a spray.

65 The other British patent upon which the Examiner relies, No. 6012, of 1909 represents the opposite extreme. Here the resistance of the plates *f* is so great that instead of entraining air in any quantity they have a tendency through the baffle effect of releasing any substantial quantity of air that may have become entrained in the liquid. The purpose of this invention is to dissolve

ozone in water. Ozone is only slightly soluble in water and to introduce enough ozone into the chamber so as to produce a mixture comparable to applicant's aerated water would simply mean a loss of the major quantity of the ozone introduced. The effect of the perforated plates is stated in the patent, to be so that the jet of fluid between each two plates is divided into several divisional currents striking against each other. In addition the plane portions of these plates form such a resistance to the passage of the water that a very little quantity of gas can be drawn through the device. The purpose of this invention being entirely different and the impossibility of producing a jet similar to that of applicant's embodies an entirely different conception and mode of operation.

Some objection was raised heretofore by the Examiner that the claims were functional in form. They are now believed to be free from that objection, by utilization of the "means" form of claims which the weight of authority now supports. Reference is made to the recent edition by Stringham on "Patent Claims". He says,—

Sec. 5230:

"Means" good. Claims in "Means" form have been sustained many times for every instance in which they have been condemned.

Sec. 5231:

"Supreme Court. Claims in "means" form have been sustained several times in the highest court.

Sec. 5233:

"Office allowance. "Means" claims are allowed by the Patent Office in numerous applications, daily.

Sec. 5236:

"Means" as structure. In various decisions it has been stated that "means" to perform a function must be regarded as a structural limitation.

66 Sec. 5237:

"Essence" good. Under numerous decisions the "essential" element of a claim may be expressed as "means" plus a functional statement.

Sec. 5262:

"Single or plural. The term "means" may be applied to one element or to more than one.

Referring now to claim 54 attention is first directed to the fact that the preamble of the claim is for a "device

for producing a coherent jet of water containing air bubbles", and the closing statement of the claim is "a coherent jet having small bubbles disseminated throughout the jet". These are limitations in the claims which cannot be disregarded in comparing them with the prior art. None of the references disclose a device which will produce a jet of this character. The reason why applicant's jet is produced is because the device is provided with a means in the path of the stream of water after it leaves the inlet orifice that finely breaks up the water and offers sufficient resistance for thoroughly mixing it with the air and unites the water into a coherent jet. This can be specifically accomplished by means of the screen 20 in Fig. 1, or it can be accomplished by means of the superposed screens 40 and 42 in Fig. 4, or it can be accomplished by the baffle 50 and screen 54 in Fig. 5, or it can be accomplished in Figs. 6 and 7 by means of the obstructions 60 and 66 respectively in association with the screen at the outlet. There being a number of different means as disclosed in the specification by which this product can be made so long as it finely breaks up the water, thoroughly mixes it with the air, and unites it into a coherent jet, it is submitted that applicant is entitled to a claim of this scope.

Claim 55 is along the same lines as claim 54 but specifies a means for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air, and other means for uniting the aerated water to form a coherent jet. This form of claim will read on Figs. 4, 5, 6, 7 and 8.

Claim 56 specifies that the resistance offered by
67 the screen is in proportion to the cross sectional area of the upstream orifice. In other words, with a screen of a definite resistance it is necessary to have an orifice of sufficient size to furnish the necessary volume of water in order that the resistance to flow may be created in the screen sufficient to entrain the air. On the other hand, with an orifice of definite size furnishing a constant volume of water, it is necessary to select a screen with a definite resistance in order that the resistance to flow may be created in the screen sufficient to entrain the air. It is this fundamental idea of finely breaking up the water and of having a certain resistance to the flow of the stream through the screen so that it will effect the mixing and uniting of the aerated water to form a coherent jet upon which applicant's invention is based.

Claims 57 and 58 which are based upon claim 54 particularize the means for accomplishing the desired end.

Since this application is under final rejection, and the time limit for appeal is January 14th, it is trusted that the Examiner will be able to give this matter early consideration. In the event that he is unable to see his way clear to allow the claims or to make any suggestions respecting further amendment thereof, then it is requested that the amendment be entered as putting the claims in better form for appeal.

Respectfully submitted,
Elie Aghnides
By John Boyle

Washington, D. C.
Jan. 12, 1940.

68 IN THE UNITED STATES PATENT OFFICE

17

In the application of
Elie Aghnides
Serial No. 182,884
Filed Dec. 31, 1937
Fluid Mixing Devices

POWER OF ATTORNEY

Hon. Commissioner of Patents,
Sir:

I hereby appoint John Boyle, Jr., 801 Washintgon Loan & Trust Building, Washington, D. C., my attorney in the above entitled application with full powers to transact all business in the United States Patent Office connected therewith.

Elie Aghnides
Applicant

69 (Letterhead—Department of Commerce)

Paper No. 18
PRN:TIS

Please find below a communication from the Examiner in charge of this application.

Conway P. Coe
Commissioner of Patents
Applicant: Elie Aghnides
Ser. No. 182,884
Filed—Dec. 31, 1937
For Fluid Mixing Devices

John Boyle, Jr.,
801 Washington Loan & Trust Bldg.
Washington, D. C.

(Mailed Jan. 13, 1940

Added art:

Friedrich	2,003,184	May 28,1935	261/116

The proposed amendment of Jan. 12, 1940, does not make the application allowable and is, therefore, not entered. Of the proposed claims it is held that claims 54-56 cover structures shown by the references of record. These claims are capable of argument only in connection with the final result and do not clearly define apparatus distinct from the references. These claims attempt to cover generically a large number of devices, each of which operates upon a different principle. In view of what the references admittedly show the generic structure is unpatentable. Attention is also directed to the patent to Friedrich, made of record above, wherein a similar product is produced and in which the structures set forth in claims 54-56 are believed to be disclosed. Attention is directed to Figs. 17 and 20 particularly, showing elements for breaking up the particles and uniting the stream.

The claims may be entered for purposes of appeal provided applicant expressly waives Ex parte Mevey 1891 C. D. 115, in regard to Friedrich and British patent 7,005.

A complete and proper response is required on or before Jan. 14, 1940, to prevent abandonment.

Fish
Examiner

P.R.N.

70 IN THE UNITED STATES PATENT OFFICE

(United States Patent Office Stamps # 20
Jan. 13-40 133270 B 2Check—15.00)

In the application of
Elie Aghnides
Serial No. 182,884
Filed Dec. 31, 1937
Fluid Mixing Devices

Div. 32
Room 4086

Appeal to the Board of Appeals

Honorable Commissioner of Patents,

Sir:

I hereby appeal from the decision of the Primary Examiner rejecting all the claims in my application. Applicant expressly waives ex parte Mevey 1891 C. D. 115, in regard to the Freidrich patent and the British patent 7,005.

The reasons of appeal are that the Examiner erred in rejecting the claims on the references and for the reasons of record.

The Appeal fee of $15 is enclosed and an oral hearing is requested.

Respectfully submitted,
Elie Aghnides,
By John Boyle, Jr.
Attorney

Washington, D. C.
Jan. 13, 1940,

Stamp—Board of Appeals—Jan 15 1940 U. S. Patent Office

71 EEG

Paper #19

DEPARTMENT OF COMMERCE
United States Patent Office
Washington

January 18, 1940

John Boyle, Jr.,
801 Washington Loan & Trust Bldg.,
Washington, D. C.
Applicant—Elie Aghnides
Serial No.—182,884
Filed—Dec. 31, 1937
For—Fluid Mixing Devices
Div. 32

In this case your power of attorney has been accepted.

Respectfully,
Conway P. Coe
Commissioner

72 Letterhead—

DEPARTMENT OF COMMERCE
United States Patent Office
Washington

January 18, 1940

In re application of
Elie Aghnides
Serial No. 182,884
Filed Dec. 31, 1937
Fluid Mixing Devices
(Div. 32)

Mr. Frank S. Appleman
1331 G Street, N.W.,
Washington, D. C.

Dear Sir:

On January 12, 1940, the applicant appointed John Boyle, Jr., as his attorney in the above entitled application; therefore, further communications from the Office will be addressed to said attorney, (ex parte Eggan, 172 O. G., 1091).

Very respectfully,
J. A. Brearley
Chief Clerk,
per F.

73 Div. 32 Room 4086 PRN:TIS Paper No. 21

UNITED STATES PATENT OFFICE
Washington, D. C.

(Mailed Jan 23 1940)

In re appliaction of
Elie Aghnides
Ser. No. 182,884
Filed Dec. 31, 1937

Before The
Board of
Appeals

For: FLUID MIXING DEVICES

EXAMINER'S STATEMENT

This is an appeal from the final rejection of claims on references also on estoppel in view of an election. Since the final rejection applicant filed the proposed amendment of Dec. 12, 1939, which was refused entry and the amendment of Jan. 12, 1940, which is entered for the purposes of this appeal. The claims presented after final rejection are of different scope from those formerly prosecuted, and upon consideration thereof and further search, it was

held that they were unpatentable over British patent 7,005, and the U. S. patent to Friedrich. Applicant has expressly waived the right to have the application remanded to the Primary Examiner under Ex parte Mevey 1891 C. D. 115. The appeal is, therefore, forwarded upon claims 54-58.

The claims are:

54. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphrgm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

74 55. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and means for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

56. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the in-

let end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet, the resistance offered by the said means and the cross sectional area of the orifice being proportioned to effect the entrainment and mixing of the air with water before their discharge from the said outlet end.

57. The device of claim 54 in which the said means comprises a screen at the discharge end of the chamber, the openings in which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

58. The device of claim 54 in which the said means comprises superposed screens, the screen at the discharge end of the chamber having apertures which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

The references are:

Friedrich	2,003,184	May 28, 1935
Haisman (Br.)	7,005	Mar. 22, 1913

The alleged invention relates to a device attachable to a common water faucet to introduce air into the stream of water to thereby form a coherent stream of water
75 including finely divided air bubbles, softening the impact to prevent splashing. The disclosure contains seven forms differing in principle as well as in means for attachment to the faucet.

By an election made May 8, 1939, Paper No. 10, applicant restricted himself to a subgeneric claim 24 which covered the forms shown by Figs. 2, 5 and 6.

Fig. 2 shows a hollow body 24 threaded at its upper end provided with a flat seat to secure the perforated disk 26 against the end of the faucet 11, a seat for screen 28 and reduced outlet aperture. The plate 26 has a large number of apertures which when the faucet is opened discharge a spray into the chamber which spray induces a flow of air through channels 30. The screen 28 mixes the air and water while the restricted outlet reduces the size of the stream.

In Fig. 5 the body 44 clamps the plate 48 having a single central orifice, a second plate 50 with a central obstruction to cause spattering to the sides and a screen 54. Small apertures adjacent the plate 48 introduce air which seems to be induced by the spattered water and mixed therewith by the screen 54 to form a stream of water including air bubbles.

Fig. 6 is similar to Fig. 5 except that the disk 56 provides water orifices near the walls of the body to form a spray striking the shelf 60 and deflected toward the center.

The patent to Friedrich relates to a foam producing apparatus and method. As shown by Fig. 2, water under pressure is supplied by pipe 32 to an annular chamber from which it enters the tube 31 by projection 35, each having an orifice 37 whereby a jet of water is formed. The water jets induce flow of air which mixes with the water to form foam. The reduced outlet extending toward the left would form a coherent stream of the foam. The water is mixed with a foam forming solution whereby
76 the foam is stabilized. In Fig. 20 the patentee adds baffles 161 to "retard the foam and by increasing turbulence render the bubbles finer" as stated on page 5, column 1, line 33.

The British patent to Haisman et al discloses a spraying device including a chamber 1 having connection 4 to a source of pressure, a diaphragm 2 providing spray orifices 3, a screen 6 in the outlet and apertures 10 permitting the free entrance of air into the chamber between the jets 3 and the screen. While the patentee expresses the intention of using the apertures 10 to remove solid particles, the jets also inherently induce air so that the water will be mixed with air. While the final product is

stated to be a spray, it is evident that the structure is closely similar to that of applicant, Fig. 2, and if there is any difference in result it must be due to some variation in proportion between the parts.

Claim 54 recites a device for producing a coherent jet of water containing air bubbles comprising a chamber 24 having inlet and outlet openings, a diaphragm 26 at the upstream end having at least one orifice, an air port 30 through which air is induced by the stream of water and means in the path of water for breaking up the water for offering sufficient resistance for mixing it with air and uniting the aerated water to form a coherent jet with small bubbles disseminated throughout the jet. The last named means is intended to cover generically the screen 28 and restricted outlet, the deflecting plate 50 and screen 54 of Fig. 5 as well as the shelf 60 and screen 62 of Fig. 6. These two devices function upon different principles.

Claim 7 is rejected as reciting structure fully met by Haisman et al. The reference includes the chamber 1, diaphragm 2, having orifice 3, air port 10 and means 6 in the path of the stream of water for breaking up the water. It may form a spray instead of a coherent jet having small bubbles but the claim recites no definite structural proportions not already shown by the reference. The claim attempts to cover generically such diverse devices as screens, Fig. 2, and baffles, Figs. 5 and 6, by differing from the reference solely by stating the final product. If the elements shown by the reference can be rearranged and proportioned in such a way as to produce the result as is apparent from comparing Fig. 2 with the patent drawing, it is evident that the claim should fully set forth such differences in terms of structure and not in result alone.

77

Claim 54 is also rejected on Friedrich wherein the series of liquid apertures 37 is equivalent to the perforated diaphragm 26, the central air intake is "the airport opening into the chamber" and the baffles 161, Fig 20, and restricted outlet are the means for mixing the air and water and forming a coherent jet having bubbles of air. The resulting product is believed to be a coherent jet in the sense used by applicant and may differ by mixing a larger proportion of air.

Claim 55 differs from claim 54 only by splitting the last "means" into two separate "means" which "means" are argued to be opposite sides of the screen 28. If so,

these means are structurally present in the British patent showing a like screen. Friedrich shows screens 161 for breaking up the water and mixing it with air as well as a constricting outlet for uniting the fluid to form a single jet.

Claim 56 is similar to claim 54 in that a single means performs the essential step in the operation. The claim states that the resistance of the "means" 28 and area
78 of the liquid orifice 26 are so proportioned as to give the result but does not state what that proportion is. In fact there is no definite teaching of any quantitative factors in this application. If a perforated plate such as shown by Fig. 5 is used the means at the outlet must be more elaborate while if the plate 26 is used the plurality of jets may merge, induce and mix with air and the screen 28 suffice to form the desired jet. For that reason the functional statement does not teach how the British patent would have to be modified to obtain the result. The claim is also believed to be met in the Friedrich patent.

Claim 57 limits the last named "means" to a screen 28 the openings of which are "sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet". Claim 54 recited only a single orifice which would produce but one stream; the screen could not, therefore, unite the streams. Fig. 5 shows a single orifice but the streams are created by a baffle plate 50 not included by this claim. Other than this inaccuracy the screen may be considered as fully met in the British patent while the baffles 161 of Friedrich would be the equivalent.

Claim 58 also depends upon claim 54 and differs from claim 57 only by including "superposed screens" in the outlet. Such screens are shown by Figs. 4 and 8 which species are excluded by the election of species, Paper No. 10. This claim is, therefore, rejected on the ground that applicant is estopped to prosecute such a claim in this application. Also the two screens differ from the mixing elements of the British patent and Friedrich only by duplicating the screen of the former and substitution
79 of equivalent in the latter.

The claims are considered to be properly rejected.

Respectfully submitted,
Karl R. Fish
Examiner, Division 32.

80

(Letterhead—Department of Commerce)

(Paper No. 22)

February 8, 1940

Sir:

The case of Elie Aghnides

Serial No. 182,884, will be heard by the Board of Appeals on the Third day of June, 1940.

The hearings will commence at 9:30 A. M. and as soon as the argument in one case is concluded the succeeding case will be taken up.

If any party, or his attorney, shall not appear when the case is called, his right to an oral hearing will be regarded as waived.

The time allowed for arguments is as follows:

Ex parte cases, thirty minutes;

Inter partes appeals: Interlocutory and final hearings when no testimony has been taken, thirty minutes each side; final hearing when testimony has been taken, one hour each side.

By special leave, obtained before the argument is commenced, the time may be extended.

The appellant shall have the right to open and conclude in inter partes cases, and in such cases a full and fair opening must be made.

Briefs in inter partes appeals must be filed in accordance with the provisions of Rules 144 and 163, as amended.

Respectfully,

Conway P. Coe

Commissioner of Patents

To Mr. John Boyle, Jr.,
801 Wash. Loan & Trust Bldg.,
Washington, D. C.

81

IN THE UNITED STATES PATENT OFFICE

23

In re application of
Elie Aghnides,
Serial No. 182,884
Filed Dec. 31, 1937
For Fluid Mixing Devices

Before the
Board of Appeals.

BRIEF

This invention relates to a device that is ordinarily applied to a water faucet for the purpose of making a jet

of water containing air bubbles uniformly disseminated throughout the jet. Such a jet is whitish in appearance, soft and light to the touch and possesses numerous advantages not found in the ordinary hard water jet as discharged from a faucet. For instance, when a full glass of water is drawn through the device, myriads of bubbles escape leaving only half of the glass full, thus proving the large amount of air that was intimately mixed with the water. If one's hand is put in the path of the bubbly jet, the jet will flow evenly and uniformly over the surface and will wet the entire surface without splashing. The softness and lightness of the jet is due to the presence of the air bubbles uniformly disseminated throughout the jet which lessens the density of the jet. If such an aerated jet is permitted to flow into a soap solution it will make a large amount of creamy lather. This result is produced by finely breaking up the water and mixing it with air before discharge to imprison in the mass of the liquid small air particles.

Various structural modifications are shown in the drawing for making the jet in this manner. In all of them there is an up-stream apertured diaphragm, an aerating chamber provided with air inlets and a down-stream screen near the discharge and which finely breaks up the water and offers sufficient resistance for thoroughly mixing the water with air.

82 In Figure 1 there is an up-stream diaphragm 16 that is provided with a plurality of apertures and a single down-stream screen. In Fig. 2 substantially the same arrangement is shown except that there are fewer apertures in the up-stream diaphragm. In Fig. 4 there is an up-stream diaphragm 36 with a plurality of apertures and two spaced down-stream screens 40 and 42. In Fig. 5 there is a single apertured up-stream diaphragm 48, a down-stream screen 54 and an interposed baffle plate 50 to assist in breaking up the water. In Fig. 6 there is an up-stream diaphragm 56 with a limited number of apertures, a down-stream screen 62 and an interposed baffle 60 to assist in breaking up the water. In Fig. 7 there is a single up-stream diaphragm 64 with a single aperture, a down-stream screen and interposed baffles 68. In Fig. 8 there are two separate inlets for different kinds of liquids with an up-stream diaphragm for each compart-

ment having a plurality of apertures and spaced down-stream screens. All of these modifications produce the same kind of a coherent white jet and make it in the same manner, that is, by finely breaking up the water and offering sufficient resistance for thoroughly mixing it with air. The essential features of the invention, as embodied in the various modified forms, shown in the drawing, comprise an up-stream apertured diaphragm, adapted to deliver a stream of water with substantial velocity and a down-stream screen in the path of the stream of water which finely breaks up the stream and mixes it with air before discharge. The screen offers only a small resistance to the flow of the stream therethrough, that is, the required minimum resistance necessary for the proper functioning of the device. In order to accomplish the desired ends there is a sufficient volume of water of such a velocity issuing from the up-stream diaphragm to spread over and flood the down-stream screens. The resistance offered by the down-stream screen or screens is sufficient to break the velocity of the stream of water, flood the screen and oblige the fluid to divide and mix.

83 When the water is turned on, if the faucet is opened only slightly so that very little kinetic energy is developed in the water as it emerges from the apertured up-stream diaphragm, the water will discharge from the down-stream screen across in a perfectly normal manner and without air bubbles. As the faucet is opened wider and the velocity of the water increases, the water emerging from the apertured up-stream diaphragm, will draw air in through the air ports and this water striking the discharge screens will be finely broken up, mixed with air and flood the screen. When the water attains a certain velocity, the entrained air acquires the necessary speed to pass through the resistance offered by the screen and the water. The air is likewise divided by the stream and the two fluids thus broken up thoroughly mix and the air particles are imprisoned in a mass of liquid. Having secured the aerated mixture it is withdrawn from the chamber in the form of a coherent jet with small bubbles desseminated throughout the jet. This arises in part from the fact that the openings in the down-stream screen are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to

form a single jet. This result can also be attained by utilizing a constricted discharge opening in association with a screen having apertures not sufficiently close together to cause the stream to unite.

THE PRIOR ART

The Examiner relies upon two references, the U. S. Patent to Friedrich and the British patent to Haisman, and takes the position that all the claims are met by either one of these references. It is admitted by the Examiner and could not otherwise be denied that neither of these patents disclose an apparatus that will make a coherent jet of water having small air bubbles disseminated throughout the jet.

84 The title of the Friedrich patent is "Method and Means for Producing Foam for Fire Extinction". There could be no confusion between a coherent jet of water having air bubbles disseminated throughout the jet and what is known as foam. In order to make the foam of Friedrich certain foam forming chemical agents must be added to the water.

The British patent is entitled a "Spraying Device". The device can be used, as stated in the patent, to produce a fine spray suitable for moistening mine workings and it is stated that the spray resembles fine rain. It can also be used for spraying paint. As will be pointed out later a spray which has a tendency to spread itself out fan-shape is entirely different from a coherent jet of water having small bubbles disseminated throughout the jet. It is quite apparent that in the spraying of paint any bubbles in the spray do not only have no purpose but would be objectionable, because it would produce an uneven coating. We will now discuss more in full these two patents.

THE FRIEDRICH PATENT.

The Examiner seems to rely particularly on the disclosure in Fig. 2 of Friedrich. This is described in the patent, page 3, column 1, lines 65 to 72 as follows:

> "In the tube shown in Figure 2 the water supplied under pressure through the hose and the connection 32 enters the annular conduit 33 and from thence is

projected through the apertures 37 and 38 in spreading jets inclined with respect to the axis of the tube into the interior thereof, where under the action of the turbulence of the jets upon the air drawn in, foam is formed."

This however is to be read in connection with the following lines, page 2, column 1, lines 8 to 13; as follows:

"It is only essential that the jets should meet one another at a small angle at a point preferably in the actual direction of the tube so that at the meeting point the jets break up, whereby with a foam former present, foam is generated."

85 It is quite apparent from such disclosures that in the absence of a foam forming agent the main purpose of the invention is lost. It is true, as stated, in page 2, second column, lines 51 to 52 that by cutting off the supplies of foam former, water can be projected instead of foam. Nothing is said however as to how much air is included in the water and if it is present, what condition the air is in the jet. It is also stated page 2, column 1 that either foam or water can be directed on a fire at will. The purpose of the foam is to act as a blanket to cut off the air supply. To add air to the water stream in the absence of foam and directing it on a fire would only be adding oxygen to facilitate combustion and thus would counteract the effect of water. There is no disclosure in the patent at any point that indicates that the patentee produces a jet having the characteristics of applicant's jet. And if he did produce such a similar jet he would have to produce it in a way different from that disclosed and claimed by applicant. The way in which Friedrich operates is by having the jets of water under pressure meet at a point in a long tube where considerable turbulence is set up. To operate efficiently this tube, as shown in the drawings, is probably more than two feet long as can be judged by the proportions of the portable type as shown in Fig. 8.

The Examiner also relies on the disclosure in Fig. 20 of Friedrich, taking the position that it is the equivalent of the down-stream screens of the applicant. The nozzle shown in Fig. 20 is used in connection with the disclosure in Fig. 19 in which foam is discharged in a closed chamber, for example an oil tank. The Examiner

takes the position that these baffles 161 will mix the air and water and form a coherent jet having bubbles of air. It is said in the patent page 5 column 1, lines 33 to 35, that these guide surfaces 161 retard the foam and by increasing the turbulence render the bubbles finer. Nothing is said in the patent as to what the effects of these surfaces 161 would be if there was no foam forming agent present. It is our position that instead of rendering the bubbles finer that they would act as baffles to eliminate the bubbles from the jet if any bubble was in the water jet.

86 The nozzle 160 of Fig. 20 is shown only in association in the construction of Fig. 19 and whether it has any other utility or not, is not disclosed in the patent. Not only that, but these nozzles do not contract the jet to form a coherent stream of water, but they permit the jet to expand due to the flaring construction. The same thing is true of the sprinkler head, shown in Fig. 17; both of these nozzles may guide the liquid but they do not divide it as does the screen of applicant; see "inclined guide vanes 99", page 4, second column, line 38, and "guide surfaces 161", page 5, column 1, line 38.

In the absence of the foam forming agent it is believed that it can be safely stated that when the water discharges from the foam generating tube 31, Fig. 2, that there is no more air occluded in the water jet than is accomplished by an ordinary injector operating on the Venturi principle. That means, that whatever air bubbles are in the water jet at the discharge they escape immediately. As specified in all the claims there is no means in the path of the stream of water after it leaves the up-stream orifice and before it discharges at the outlet ends for finely breaking up the water and mixing it with air.

THE BRITISH PATENT

While there is some pictorial resemblance between the device of the British patent and applicant's device, it is quite apparent that their mode of operation must for some reason be entirely different, otherwise one would not produce a spray and the other produce a coherent jet. In order to produce a spray no air is necessary. All

that is required is a means for subdividing finely the stream of water outside of the device. It is stated in the British patent, page 2, lines 25 to 27 that there is a nozzle employed "so as to cause a free and substantially unbroken jet of liquid to impinge upon a stationary foraminous screen of the nature of wire fabric." As this unbroken jet of liquid hits the screen in the British patent, due to the fact that there is insufficient re-
87 sistance in the screen, the jet of water is merely subdivided and passes into the atmosphere in the form of a mist but without any mixing of air in the stream of water. The reason why there is no mixing of air is because the combined areas of the nozzles at the upstream end are relatively small as compared with the area of the discharge outlet, and the relative resistance to such a fine high velocity stream is low.

In order to make the British patent function in the same way as in applicant's device, one of two things would have to be done. The resistance of the screen at the outlet end would have to be increased to such a point that it would entrain the air inside of the chamber and mix it with the water. One way of accomplishing this increased resistance would be by using a plurality of screens superposed on each other. The other way would be by increasing the total orifice area at the upstream end and from whence it impinges on the screen. By so doing the water instead of merely passing through the screen floods the face of the screen and entrains the air in it producing the jet effect. It is apparent that until air is mixed with the water by the screen and as it leaves the screen, there will be no substantial induction of air through the air ports. Only so much air is drawn through the air ports as leaves at the discharge end of the device mixed with the water and in the British patent the mixing is nil. The openings 10 might serve to maintain the atmospheric pressure as the gradual rarefaction might break the jets which, according to the requirements of the British patent must be substantially unbroken, contrary to applicant's device which is arranged to break the jets and to mix them with the water before the discharge. The British patent does not claim that there is any air induced through the openings 10 and the purpose stated is to scavenge, but should the openings 10 improve the spray it is for the reasons just stated.

88 THE NOVELTY IN APPLICANT'S CLAIMS.

All the claims are limited to a device for producing a coherent jet of water having small bubbles disseminated throughout the jet. This is a distinctive limitation in the claims and since neither one of the patents produce such a jet it is submitted that that alone would be enough to warrant the allowance of the claims. The claims do not cover all means for making such a jet but only such means as are in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end and this means must have the capacity of finely breaking up the water and offering sufficient resistance for thoroughly mixing it with air, and thereafter uniting the aerated water to form a coherent jet. The Examiner rejects on the ground that this is not a structural limitation. We refer to a long list of authorities on Page 5 of the amendment of Jan. 12, 1940. In a recent case decided by the Board ex parte Long 45 U.S.P.Q. Examiner in Chief Shaffer held:

> "Claims for means coupled with statements of function are allowable where there is no ambiguity. It has long been the practice of the Patent Office to permit use of means coupled with statements of function as a convenient way in which to concisely express subject matter"

In view of the various ways in which this result can be accomplished and the result being novel it is difficult to see what other satisfactory way can be had for adequately claiming the invention. There is certainly no ambiguity in this phraseology.

Claim 55 contains the additional limitation of a separate means for uniting the aerated water. Claim 56 contains in addition to the limitations of claim 54 the relationship between the resistance of the screen and the velocity of the entering water as measured by the cross sectional area of the orifice so as to flood the screen.

Claim 57 specifies the presence of a screen at the discharge end of the chamber, the openings in which are sufficiently close together to cause the streams of aerated water to join together to form a single jet.

89 Claim 58 contains in addition to the limitations of claim 54 superposed screens and nowhere shown in any of the references.

The absence of any reference that shows the production of a jet of this character and even if they did, the absence of the means set forth in these claims for accomplishing the result, and the concise and clear limitations on the means for accomplishing the result are any one of them believed to be sufficient to warrant the allowance of the claims.

THE EXAMINER'S STATEMENT

Page 3, line 2, the Examiner states that "the disclosure contains seven forms differing in principle", but he does not state in what respect they differ in principle. This application has had a long prosecution and this is the first time that this objection has been raised. We submit that all of the forms are similar in principle in securing the specified jet of water.

In the next paragraph on page 3 the Examiner says that applicant restricted himself to a sub-generic claim 24 which covered the forms as shown by Figs. 2, 5 and 6. It is desired to point out however that as applicant's attorney reads claim 24 it covers not only the forms shown in Figs. 2, 5 and 6 but also the forms as shown in Figs. 4 and 7. The Examiner has not pointed out the limitations that so restrict this claim and it is not believed that he can. We rather assume that he is seeking to put a very limited interpretation on a casing having its upper end enlarged to form an internal shoulder; but this construction is surely disclosed in Figs. 4 and 7. In any event we are not so sure that applicant did so elect to limit his invention.

But whether that be true or not applicant is entitled to prosecute in this application generic claims and any three elected species and since he has only elected one, if the Examiner is correct, this permits the addition of two more species claims.

90 At the bottom of page 3 the Examiner explains his position with reference to the Friedrich's patent, but there are statements here that cannot be found in the patent specification and cannot otherwise be justified. The Examiner states "the water jets induce flow of air which mixes with the water to form foam". There is no such mode of operation disclosed in Friedrich unless the foam forming agent is added to the water, before the air is mixed with it. He further states that the reduced out-

lets would form a coherent stream of foam, but the limitations in the claims call for a coherent jet of water and no one would ever designate a stream of foam as a stream of water. The Examiner further states that, "the water is mixed with a foam forming solution whereby the foam is stabilized", but there is no such statement in the patent to that effect. The foam forming solution is primarily added to form foam and by reference to page 2 of the Friedrich patent, column 1, line 75 the foam forming feature is the important aspect of the operation and not as suggested by the Examiner, the stabilization of the foam. The Examiner goes on to state that the baffles 161 retard the foam by increasing turbulence and render the bubbles finer, but he is careful not to state that the same thing would occur to a jet of water.

On page 4 the Examiner discusses the British patent and takes the position that the jets will induce air so that the water will be mixed with the air. He then goes on to state that the final product is a spray, but since a spray is only sub-divided water and the Examiner admits the final product is a spray it is difficult to see just where the air would be in the spray. We agree with the Examiner that the difference in result is due to some variation in proportion between the parts and that variation has been heretofore discussed in applicant's analysis of the British patent.

The Examiner, four lines from the bottom of page 4, says that the devices of Figs. 5 and 6 function upon different principles but he does not state what the difference is. We submit that the deflecting plate 50 of Fig. 5 and the shelf 60 of Fig. 6 both function in the same
91 way to assist in breaking up the water into fine particles.

The Examiner on page 5 attempts to apply the British patent to claim 54. He admits that it forms a spray instead of a coherent jet but says that no definite structural proportions, not shown by the references, are set forth in the claims. We have already covered this so fully that it needs no repetition here. The fact of the matter seems to be that any type "of means claims" in the opinion of the Examiner is a claim for a result and not for a structure.

We are unable to find how the Examiner on the basis of the disclosure of the Freidrich patent can say that

the baffles 161 are means for mixing the air and water in the sense of breaking up the fluid to form bubbles in the water. To say that the resulting product of Friedrich is a coherent jet in the sense used by applicant but differing from applicant's by mixing a large proportion of air is doing a good deal of violence to the Friedrich disclosure.

The Examiner says that the resulting product of Friedrich is a coherent jet in the sense used by applicant but may differ by mixing a larger proportion of air. In the absence of a foam forming agent, the air entrained through Friedrich's nozzle will separate from the water at the discharge end of said nozzle, for the reason that said air is not imprisoned in the mass of the water in the form of small air bubbles. This is not the case with applicant's jet and no foam forming agent is necessary. A coherent jet of liquid containing bubbles of water as in applicant's case is not the same in properties or uses as a stream of foam as disclosed by Friedrich.

As to claim 55 the Examiner says that the British patent shows a like screen that has the same mode of operation as applicant's but in view of the fact that the British patent produces a divergent spray and applicant a coherent jet, it is hard to see how the Examiner can reach any such conclusion.

92 The Examiner says that Friedrich shows screens 161 for breaking up the water and mixing it with air as well as a constricting outlet for uniting the fluid to form a single jet. This is a highly inaccurate statement. The guide surfaces 161 are by no imagination screens; nor do they break up the water and mix it with air but instead they zig-zag the stream and are in the nature of an elongation of the tube. Not only is the outlet not constricting but on the other hand it is an expanding outlet, as can be clearly seen in Fig. 19.

As to the claim 56, the Examiner says that there is no quantative factors that teach proportions in this application. We might rest on the proposition that this is only a statement of the inherent functioning of the device but the disclosure on page 5, lines 1-14 makes clear that there is a very distinct quantitative relation between the velocity of the stream and the resistance offered by the down stream screen and since the aperature area of the up-

stream screen is a function of the velocity of the entering water, it is submitted that there is sufficient teaching to any one skilled in the art seeking to accomplish the desired end.

As to claim 57 the position of the Examiner is confused and unintelligible. It is predicated on the assumption that claim 54 only refers to a single orifice in the upstream screen but that is in error. Claim 54 states that the upstream screen has at least one orifice but obviously by that statement it can have more. Even if there was only one orifice, still the screen could unite the stream issuing therefrom when the openings are close enough to each other. There is no necessity of an interposed baffle when using a single aperture in the upstream screen, although the baffle might assist the breaking of the water, but it is not essential as will be apparent from an inspection of the various forms.

To say that the screen of applicant's device finds its equivalent in the British patent or Friedrich is to ignore the fundamental characteristics of a mechanical equivalent, which necessitates similarity in function.

93 As to claim 58, it has already been pointed out that there was no election that limited the species to Figs. 2, 5 and 6. If superposed screens were put in the British patent then instead of forming a spray it would then form applicant's jet. Certainly one screen or superposed screens are not the equivalent of the dividing means proposed by Friedrich.

Considering the statement of the examiner as a whole we cannot help but feel that every doubt, instead of being resolved in favor of the applicant has been resolved against him. Both of the patents that are now relied upon were never cited in this application until after it had been finally rejected. The patent of Friedrich now so strongly relied upon was never cited until Jan. 13, 1940 and the time that was left for an appeal was only one day. This is really the first time we have had an opportunity to present our version of the Friedrich patent, and the conclusion of the Examiner thereon was not a deliberate one arrived after a full discussion from both sides. The Board of Appeals therefore is in a position of being the first ones to review the position of the

applicant with respect to the pertinency of the Freidrich patent.

Respectfully submitted,
Elie Aghnides
By John Boyle, Jr.
Attorney.

June 3, 1940.

94 In the United States Patent Office

Paper # 24

(Board of Appeals U. S. Patent Office June 7, 1940)

In re application of
Elie Aghnides,
Serial No. 182,884
Filed Dec. 31, 1937
For Fluid Mixing Devices

Before the
Board of Appeals

Supplemental Memorandum

The following demonstrations made by the inventor before the Board of Appeals at the hearing on June 3, 1940 were for the purpose of establishing facts, as listed below.

Applicant's Device

1. The jet is coherent and contains air-bubbles imprisoned in the flowing jet of water.
2. The jet is soft and light to the touch owing to myriads of air bubbles that one can see escaping.
3. The flow of the bubbly jet in a receptacle on liquid soap transformed the latter to an abundant creamy lather with bubbles all very small and of the same size.
4. The bowl which served for the soap experiment, turned upside down and put under the jet, was covered with bubbles and the flow was splashless.
5. The soap experiment repeated with the air ports closed gave practically no lather.
6. The bubbly jet, white in appearance when the air ports are open becomes transparent and free from air bubbles when the air ports are closed.

The Spraying Device of the British patent to Haisman.

1. With the "apertures 10" open, the jet is a diverging stream of rain like droplets, with total absence of air

bubbles in the stream.

95 2. With the "aperatures 10" closed, the appearance of the diverging rain like stream was the same as when the aperatures are open, showing that no air is induced through the aperatures.

3. To the touch, the rain like stream of droplets is quite different from applicant's jet.

4. The spraying jet is a splashing one.

The Foam Former of the Freidrich patent.

1. The jet is coherent in the same way as the ordinary water discharged from the faucet.

2. The jet is hard to the touch and splashing because whatever air is entrained through the device is not in the form of small bubbles imprisoned in the mass of the water jet and the air separates immediately from the water at the discharge end of the device and does not remain in the jet.

3. The flow of the jet on liquid soap produced some lather, formed by big bubbles of varying size. This lather was due to the agitation caused by the flow of the jet into the bowl containing the liquid soap and not from imprisoned air in the jet.

4. The soap experiment repeated with the air ports closed gave the same amount and kind of lather as with the air ports open, proving that the lather produced when the air ports were open was not due to the air entrained through the device. Further evidence was given in this respect by the soap experiment without any device but the water flowing from the faucet directly into the bowl containing the liquid soap, the same kind of lather being produced as with the Friedrich device.

5. The jet is grayish when the device is functioning normally, like the ordinary tap water flowing with high velocity, and remained the same when the device was operated with the air ports closed.

96 Comparison of Haisman's Device and Applicant's.

Haisman's spraying device was transformed to applicant's mixing device by putting at the outlet, a screen offering greater resistance to cause mixing of the air and water. The aperture 10 of Haisman then became for the first time, air induction inlets. The same result is possible by leaving the screen unchanged but increasing the cross sectional area of the upstream apertures

whereby the water emerges to impinge on the wire mesh screen with less velocity and which is equivalent to an increase of the resistance offered by the screen.

The demonstration proved that applicant's device can operate with one or more screens. All that one has to do to make a device according to the invention is to admit into the aerating chamber a jet of water with substantial velocity and to put in the path of the jet, one or more of the specified screens to obtain the bubbly jet.

Respectfully submitted,
John Boyle, Jr.,
Attorney.

June 7, 1940.

97

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Appeal No. 33,918

VFM

Hearing: June 3, 1940

(Stamp—U. S. Patent Office—Board of Appeals—June 18 1940)

IN THE UNITED STATES PATENT OFFICE

Before the Board of Appeals

Ex Parte Elie Aghnides

Application for Patent filed December 31, 1937, Serial No. 182,884. Fluid Mixing Devices.

Mr. Frank S. Appleman and Mr. John Boyle, Jr. for applicant.

This is an appeal from the final rejection of claims 54 to 58.

Claim 54 is illustrative.

54. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the

chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

The references relied upon by the examiner are as follows:

Haisman et al (Brit.)
Friedrich 2,003,184 May 28, 1935

98 The invention relates to a device attachable to a water faucet which will introduce air into the water passing through it and form a coherent jet of aerated water issuing from it. The coherent water jet contains finely divided air bubbles. The device includes a chamber, a diaphragm at the inlet end of the chamber having at least one orifice in it for the passage of water to the chamber. The chamber is also provided with air inlets in its wall adjacent to and below the diaphragm. Water passing through the diaphragm sucks in air through the openings. The chamber is provided near the lower end with a screen which breaks up the stream of water and offers sufficient resistance for thoroughly mixing the water with the air drawn into the chamber. The extension of the chamber below the screen is restricted in cross section and serves to unite the aerated water into a coherent jet. This jet contains the air bubbles disseminated through it and remains coherent as it issues and does not tend to spread or splash.

The examiner depends on the disclosures of either one of two references in rejecting the claims. The Friedrich patent relates to a fire extinguishing device for producing foam. Referring to Figs. 19 and 20 of the patent, these figures disclose a long tube open at the inlet end to permit air to be sucked into the tube. Water containing a foam producing agent is admitted through openings in the side wall of the tube near the inlet end and the water sucks air into the tube. The outlet end of the tube is provided with a distributing sprinkler head which is fan-shaped and discharges a relatively wide and fairly thin stream. Within the head are arranged a series of

staggered baffles which retard the foam and by increasing the turbulence render the bubbles finer. This patent does not appear to show a construction that anticipates the claims before us. There is no thought expressed in the patent of forming a coherent jet of water with which the air bubbles are admixed and it would not be possible to obtain such a jet with the patented construction. The patentee desires mainly to mix air with a liquid containing a foam producing agent so as to produce foam and foam and water issues in a broad fan shaped stream from the distributor head.

The British patent discloses a spraying or atomizing device. It comprises an elongated cylindrical nozzle, a strainer near the liquid inlet and, a diaphragm spaced a short distance from the strainer and provided with small tubes through which the liquid passes. Adjacent to the outlet and there is arranged a screen which may be of any desired mesh. Approximately half way between the diaphragm and the screen the cylindrical wall of the nozzle is provided with three large openings. The patentee states that these openings provide an outlet for solid matter and induce a more perfect spray and minimize dripping. The device is intended for use in spraying paint or for atomizing liquids. There is no particular reference made to the entrainment of air and mixing it with the liquid or for forming a coherent jet of liquid with air bubbles in it. The distance of the large openings 10 from the diaphragms is so great that it is somewhat doubtful that any material amount of air will be entrained. If there is any mixing of the air with the liquid it appears to be a rather small amount. There is no constricting of the nozzle at the outlet so as to form a co-
100 herent jet. The patentee desires to obtain a spraying device and the liquid will spread out as it leaves the nozzle. It is clear that this patent contains no disclosure of the construction covered by the appealed claims.

It is also not evident how the two patents could be combined to meet the claims. We therefore believe the claims are patentable.

The decision of the examiner is reversed.

/s/ Eugene Landers
Examiner-in-Chief

/s/ P. Edinburg
Examiner-in-Chief
/s/ C. S. Shaffer
Examiner-in-Chief

June 18, 1940
Mr. John Boyle, Jr.,
801 Washington Loan & Trust Bldg.,
Washington, D. C.

101

Serial No. 182,884

(Letterhead—Department of Commerce)

(Margin Notations: In remitting the final fee give the serial number at the head of this notice: Uncertified Checks will not be accepted.)

Mailed Jun 25 1940

Elie Aghnides

Your APPLICATION for a patent for an IMPROVEMENT in FLUID MIXING DEVICE filed Dec. 31, 1937 has been examined and ALLOWED with 5 claims.

The final fee, THRTY DOLLARS, WITH $1 ADDITIONAL FOR EACH CLAIM ALLOWED IN EXCESS OF 20, must be paid not later than SIX MONTHS from the date of this present notice of allowance. If the final fee be not paid within that period, the patent will be withheld; SEE REVISED STATUTES, SECTION 4885 AS AMENDED BY ACT OF CONGRESS APPROVED AUGUST 9, 1939.

The office delivers patents upon the day of their date, on which date their term begins to run. The preparation of the patent for final signing and sealing will require about four weeks, and such work will not be begun until after payment of the necessary final fee.

When the final fee is paid, there should also be sent, DISTINCTLY AND PLAINLY WRITTEN, the name of the INVENTOR, TITLE OF THE INVENTION, AND SERIAL NUMBER AS ABOVE GIVEN, DATE OF ALLOWANCE (which is the date of this circular), DATE

OF FILING, and, if assigned, the NAMES OF THE ASSIGNEES.

If it is desired to have the patent issue to an ASSIGNEE OR ASSIGNEES, an assignment containing a REQUEST to that effect, together with the FEE for recording the same, must be filed in this office on or before the date of payment of the final fee.

After issue of the patent, uncertified copies of the drawings and specifications may be purchased at the price of TEN CENTS EACH. The money should accompany the order. Postage stamps will not be received.

The final fee will NOT be received from other than the applicant, his assignee or attorney, or a party in interest as shown by the records of the Patent Office.

NOTICE.—WHEN THE NUMBER OF CLAIMS ALLOWED IS IN EXCESS OF 20, NO SUM LESS THAN $30 PLUS $1 ADDITIONAL FOR EACH CLAIM IN EXCESS OF TWENTY CAN BE ACCEPTED AS THE FINAL FEE.

Respectfully,
Conway P. Coe
Commissioner of Patents.

THIS APPLICATION
CANNOT BE RENEWED.
John Boyle, Jr.
801 Washington, Loan & Trust Bldg.
Washington, D. C.

102 (Stamps U. S. Patent Office)

IN THE UNITED STATES PATENT OFFICE
26 Amdt H

In the application of
Elie Aghnides
Serial No. 182,884
Filed Dec. 31, 1937 Div. 32
Fluid Mixing Devices Room 4086

AMENDMENT UNDER RULE 78.

Hon. Commissioner of Patents,
Sir:

In the petition, line 2, cancel "Brussels, Belgium" and insert—New York, New York—, line 2, cancel the post-office address and substitute—609 West 158th Street, New York, N. Y.—; line 2, cancel "Greek Republic" and substitute—Kingdom of Greece—.

In the specification preamble, line 2, cancel "Greek Republic" and substitute—Kingdom of Greece—; line 2, cancel "Brussels, Belgium" and substitute—New York, New York—.

Page 2, line 9, cancel "an aperture" and substitute—one or more apertures—.

Page 2, line 16, cancel beginning "water" to the end of the sentence, line 19, and substitute—stream of water after it leaves the aperture or apertures and before it discharges at the outlet and for finely breaking up the water and offering sufficient resistance for thoroughly mixing it with air—.

Page 2, line 22, before "chamber" insert—cross section of the—.

Page 2, line 24, after "aperture" insert—or apertures—.

In the amendment to page 3, dated June 18, 1038, cancel the paragraphs comprising the last twelve lines on page 1 of said amendment and the first eight lines on page 2 of the said amendment and substitute therefor the following:

103 —The essential feature of my invention is an arrangement of a dividing means in the path of the liquid emerging from the aperture or apertures delivering liquid to the aforesaid chamber, this dividing means being adapted to finely break up the fluids and to imprison in the liquid, air particles forming therein such small bubbles that they remain in suspension in the jet.

In the devices suggested until now, the air drawn in by the liquid separates immediately at the outlet of the apparatus and no known apparatus has for its object, as is the case with my invention, the formation of a coherent "white" jet, this being due to the fine division of the air and to the formation of a true suspension of a multitude of air bubbles in the water.—

Page 3, line 21, cancel "the aperture through which", line 22, cancel "is subdivided into" and substitute—through—; line 23, cancel the rest of the sentence after "apertures".

Page 4, line 2, before "screens" insert—superposed—.

Page 4, cancel the inserted amendment of June 18, 1938 for lines 3 to 6 of the original specification and found on page 2 of the said amendment, lines 14 to 18.

Cancel the amendment to page 4 after line 9, dated Feb. 17, 1938, and found on the last six lines of page 1 and

lines 1 to 10 of page 2 of said amendment, and substitute therefor the following:

—Such a screen finely breaks up the water and offers sufficient resistance for thoroughly mixing it with air. On the other hand, the resistance of the screen is low enough to permit passage of the air in form of bubbles disseminated in the water. The streamlets of aerated water are sufficiently close together, so that on issuing, they join each other to form a single jet.—

104 Page 5, cancel lines 1 to 13 through the period, and insert the following:

—When the water is turned through this device, if the faucet is opened only slightly, so that very little kinetic energy is developed in the water, as it emerges from the perforations in the screen 16, in proportion to the resistance of the screen 20, then the water will come out of the discharge 22 without air bubbles. On the other hand, as the faucet is opened wider, the velocity of the water emerging from the perforations in the screen 16, increases and acquires the necessary kinetic energy relative to the resistance of the screen 20, to effect entrainment and mixing of the air with the water.

While the total cross sectional area of the perforations in the screen 16, under the usual conditions of operation, is such as to force the water into the chamber with substantial velocity and the screen 20 has the proper relative resistance thereto, to effect the desired result, it is obvious that any change in the cross sectional area of the perforations in the screen 16 will require a change in the resistance of the screen, to establish the proportion necessary for the maintenance of substantially the same result.—

Cancel the amendment dated June 18, 1938 to page 5, last line before "Again".

Page 6, line 7, cancel beginning "and" to the end of the sentence, and substitute —jet—.

Page 8, line 18, before "plates" insert—perforated up-stream—; line 18, cancel "forming the"; line 19, cancel "inlet apertures" and "for the outlet baffles"; line 19, before "screens" insert—down-stream—.

105 Remarks.

The amendment herewith is merely for clarifying certain portions of the disclosure in the specification and to

make it conform more closely with the allowed subject matter of the claims.

Respectfully submitted,
Elie Aghnides
By John Boye, Jr.
His Attorney.

Entry *in part* Recommended Under Rule 78.
Karl R. Fish, Examiner.

Washington, D. C.,
July 1, 1940.

106

(Letterhead—Department of Commerce)
Paper No. 27

Mailed July 8-1940 KRL:TIS

Applicant: Elie Aghnides.
Ser. No. 182,884
Filed Dec. 31, 1937
For Fluid Mixing Devices

John Boyle, Jr.
801 Washington Loan & Trust Bldg.
Washington, D. C.

The entry of the amendment proposed under Rule 78 has been *made in part* disapproved. A copy of the examiner's adverse report appears below.

Conway P. Coe
Commissioner of Patents.

The entry of the proposed amendment is recommended except for the change in applicant's post office address. Under existing practice directions for such change must be over applicant's signature whereas this amendment is by his attorney.

Karl R. Fish
Examiner.

Approved
July 8-1940.
Henry Van Ansdale
Asst. Commissioner of Patent

107

In the United States Patent Office

28

In the application of
Elie Aghnides
Serial No. 182,884
Filed Dec. 31, 1937
Fluid Mixing Devices

Div. 32
Room 4086

AMENDMENT UNDER RULE 78

Honorable Commissioner of Patents,
Sir:

In the above entitled application, please change my post-office address to—609 West 158th Street, New York, N. Y.

Elie Aghnides
Elie Aghnides

New York, N. Y.
July 10, 1940.
Entered under Order 3311
Karl R. Fish
Examiner.

108

IN THE UNITED STATES PATENT OFFICE

29

In the application of
Elie Aghnides
Serial No. 182,884
Filed Dec. 31, 1937
Fluid Mixing Devices

Allowed
June 25, 1940

Hon. Commissioner of Patents,
Sir:

In the matter of the above entitled application, please enter therein the attached supplemental oath and claims.

Respectfully submitted,
John Boyle, Jr.
Attorney for Elie Aghnides.

Washington, D. C.,
July 8, 1940

109

SUPPLEMENTAL OATH

(Stamp—U. S. Patent Office
Jul 11 1940
Issue Division)

Stamp—Application Division—U. S. Patent Office— Jul 11 '40

State of New York }
County of Bronx } ss.

Elie Aghnides, whose application for letters patent for an improvement in Fluid Mixing Devices, Serial No. 182,884, was filed in the United States Patent Office on De-

cember 31, 1937, being duly sworn deposes and says that he is a citizen of the Kingdom of Greece and now a resident of New York City, New York; that the subject-matter of the annexed claims 54-58 inclusive, was invented before his filed his original application, above identified for such invention, that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or patented or described in any printed publication in any country before his invention or discovery thereof, that he does not know and does not believe that the same, except as to matters disclosed in his prior application Serial No. 52,293, was patented or described in any printed publication in the United States of America, or any foreign country more than two years prior to this application, or in public use or on sale in the United States for more than two years prior to this application; that said invention has not been patented in any foreign country on an application filed by himself or his legal representatives or assigns more than twelve months prior to his application in the United States and has not been abandoned.

Elie Aghnides

Sworn to and subscribed before me this 6th day of July, 1940.

Notary Public.

(Seal)

110 54. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

55. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and means for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

111 56. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet, the resistance offered by the said means and the cross sectional area of the orifice being proportioned to effect the entrainment and mixing of the air with water before their discharge from the said outlet end.

57. The device of claim 54 in which the said means comprises a screen at the discharge end of the chamber, the openings in which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

58. The device of claim 54 in which the said means comprises superposed screens, the screen at the discharge end of the chamber having apertures which are sufficiently

close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

112 Rule 78

FINAL FEE PAID TO THE COMMISSIONER OF PATENTS

Stamp—Mail Division—Jul 11 1940—U.S. Patent Office
Jul-11-40 007048 H 2Check—30.00

Serial No. 182,884
Inventor—Elie Aghnides
Patent to be issued to—do
Name of Invention, as Allowed: Fluid Mixing Devices
Date of Payment: July 11/40
Fee—Final 30
Date of Filing: Dec. 31/37
Date of Circular of Allowance: June 25/40

The Commissioner of Patents will please apply the accompanying fee as indicated above.

John Boyle, Jr.
Attorney.

Send Patent to—John Boyle, Jr.
900 A St., N. W., D. C.

Final fees will not be received from other than the applicant, his assignee or attorney, or a party in interest as shown by the records of the Patent Office, NOR WILL THEY BE APPLIED IN PENDING APPLICATIONS.

113 Div. 32 Room 4086 Paper No. 30

Letterhead—

DEPARTMENT OF COMMERCE
United States Patent Office
Washington

Mailed—Jal 13 1940
John Boyle, Jr.
801 Washington Loan & Trust Bldg.
Washington, D. C.

Applicant: Elie Aghnides
Ser. No. 182,884
Filed Dec. 31, 1937
For Fluid Mixing Devices

The amendment proposed under Rule 78 has been entered under authority of Commissioner's Order No. 3311.
Examiner.

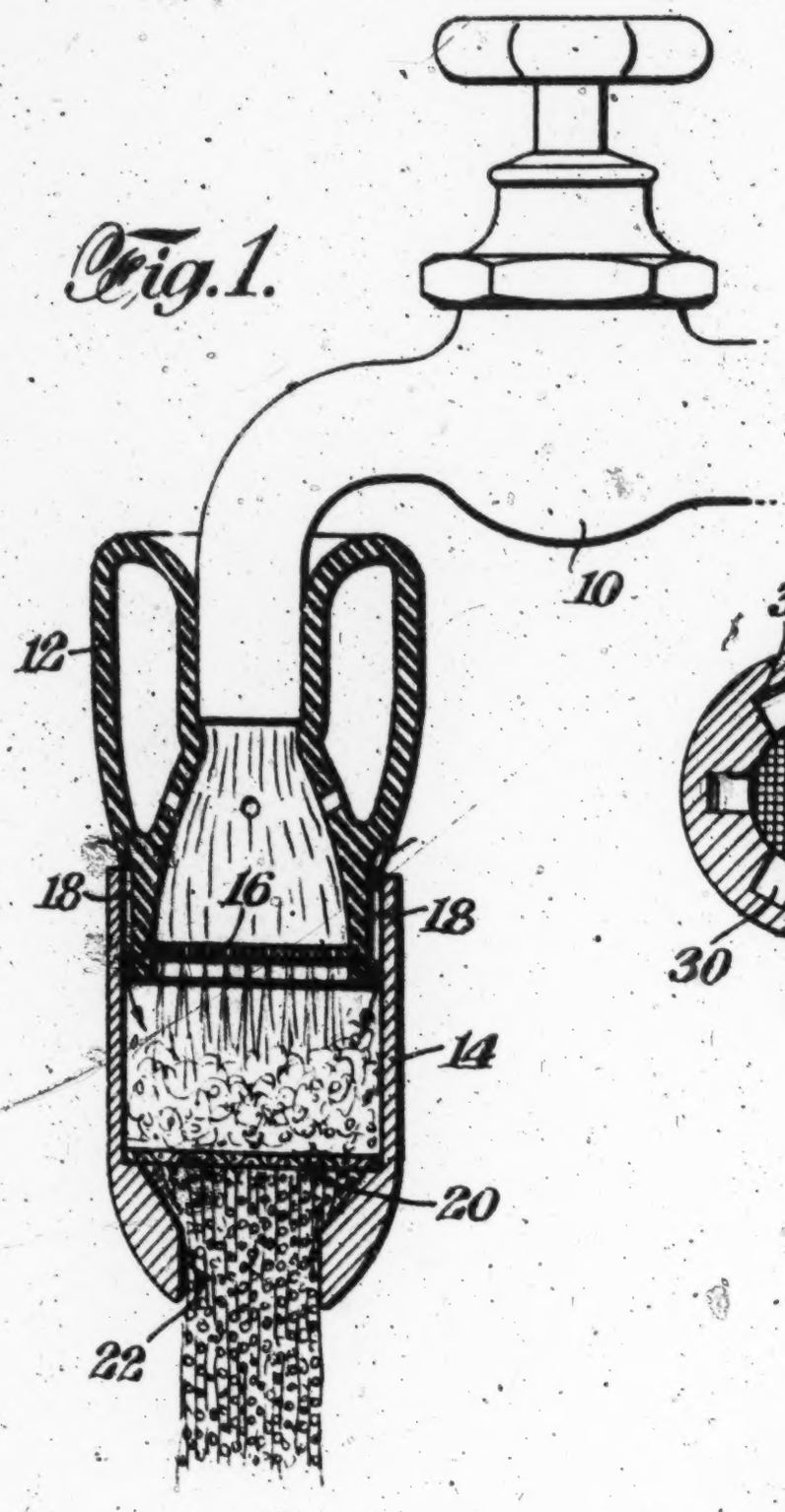
Aug. 6, 1940. E. AGHNIDES

FLUID MIXING DEVICE

Filed Dec. 31, 1937

2 App. 131
2,210,846

Fig. 1.



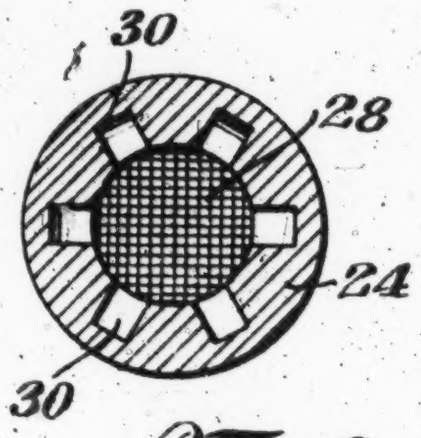


Fig. 3.

Fig. 4.

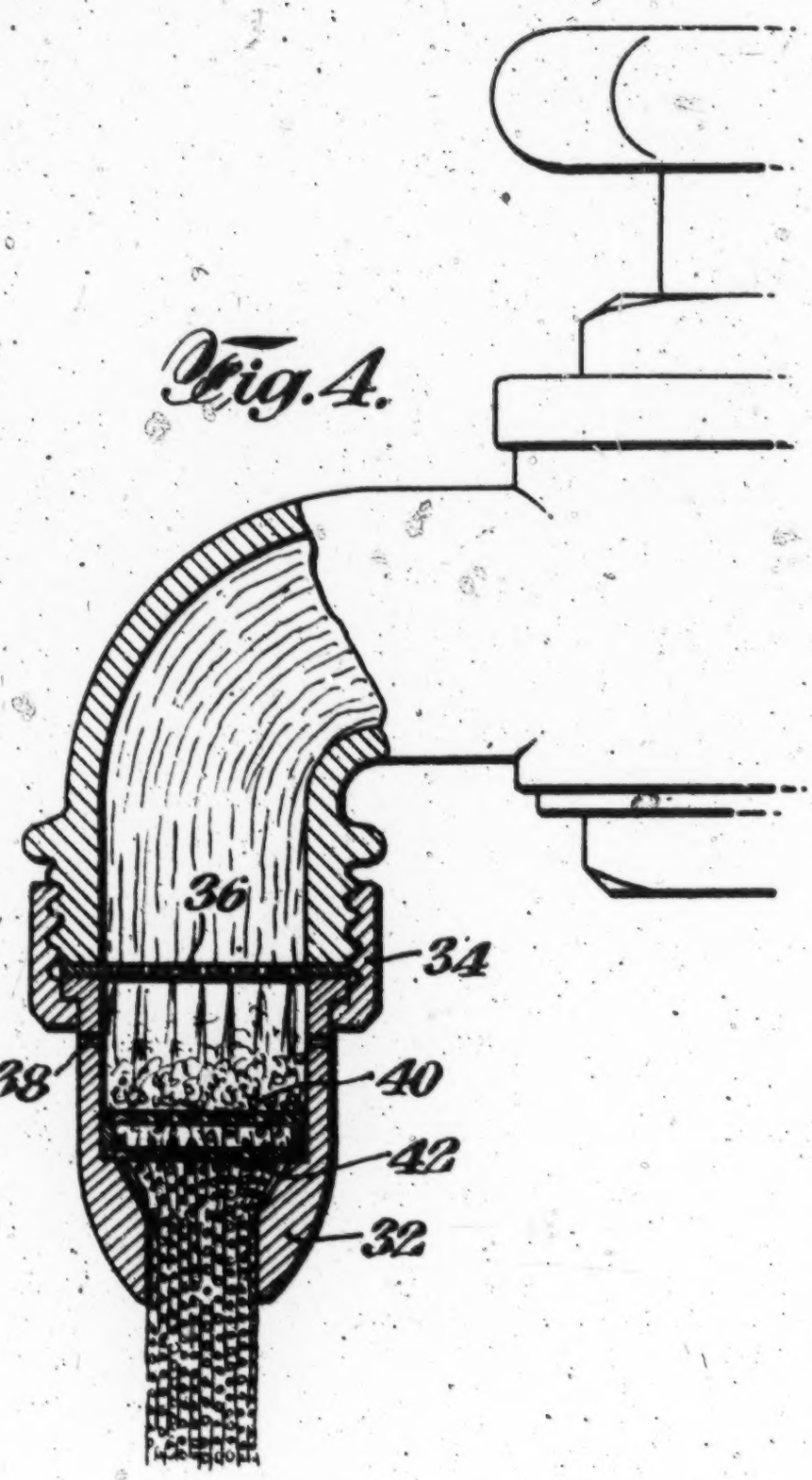


Fig. 8.

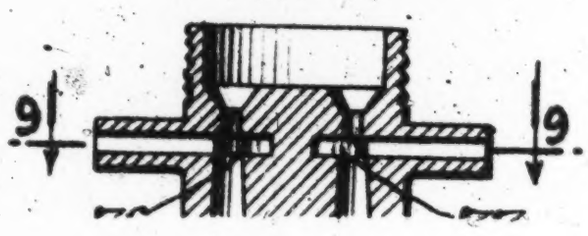


Fig. 2.

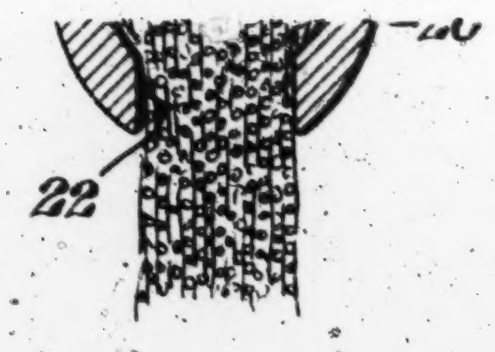


Fig. 5.

Fig. 8.

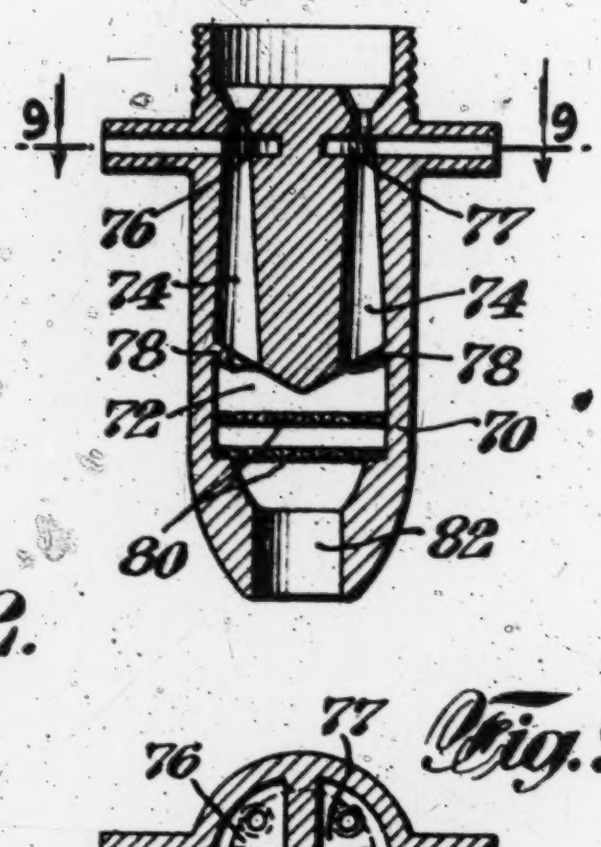


Fig. 2.

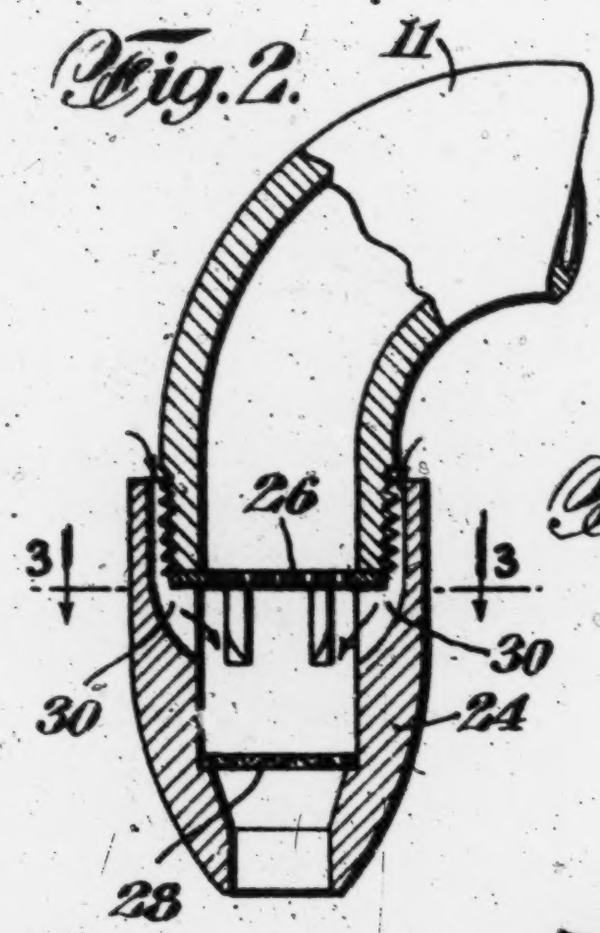


Fig. 9.

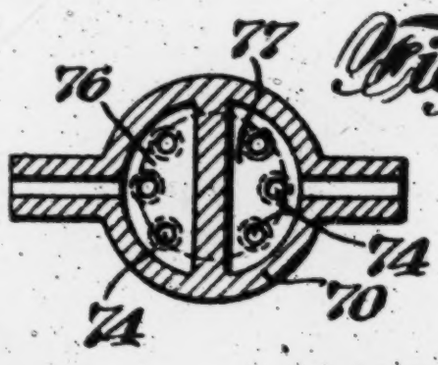
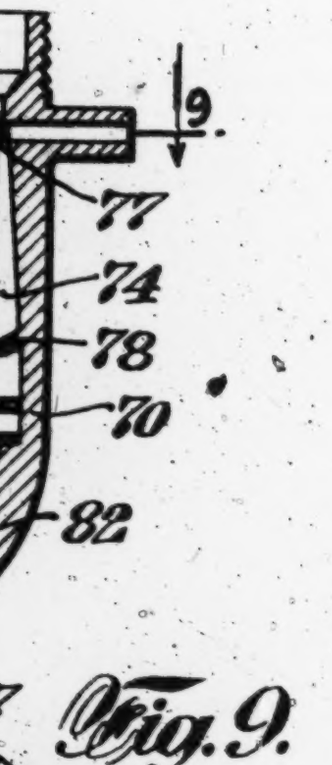


Fig. 6.

Fig. 7.



INVENTOR,
Elie Aghnides,
BY
Frank S. Ashlemon,
ATTORNEY.

UNITED STATES PATENT OFFICE

2,210,046

FLUID MIXING DEVICE

Elie Aghnides, New York, N. Y.

Application December 31, 1937, Serial No. 182,884
In Belgium December 8, 1934

5 Claims. (Cl. 261—76)

This invention relates to a device for intimately mixing a gas with a liquid, and ordinarily is employed for aerating water. This application is a continuation in part of my earlier application Serial No. 52,923, filed December 4, 1935.

Broadly speaking, my invention consists of a device intended to be connected to a source of liquid under pressure, such as an ordinary water tap, and includes a chamber provided with one or more apertures through which the water is forced into the chamber with substantial velocity and as a result the liquid stream has very substantial kinetic energy. Proper openings are provided leading into the chamber from the outside air so that the flow of water will draw air into the chamber according to the well-known Venturi principle. In accordance with my invention, means are provided in the path of the stream of water after it leaves the aperture or apertures and before it discharges at the outlet end for finely breaking up the water and offering sufficient resistance for thoroughly mixing it with air. An outlet for the chamber is provided from which the water mixed with air can emerge. It is advisable to have the outlet of smaller cross section than the cross section of the chamber so that the water will flow in a coherent stream; but the outlet should be of sufficient size relative to the aperture or apertures through which the water is introduced into the chamber so that the water mixed with air will emerge at a substantially lower velocity than the water entering the chamber. Of course, when I refer to the outlet forming a coherent stream, I do not mean to imply that the outlet cannot be divided into several such streams, if desired.

The essential feature of my invention is an arrangement of a dividing means in the path of the liquid emerging from the aperture or apertures delivering liquid to the aforesaid chamber, this dividing means being adapted to finely break up the fluids and to imprison in the liquid, air particles forming therein such small bubbles that they remain in suspension in the jet.

In the devices suggested until now, the air drawn in by the liquid separates immediately at the outlet of the apparatus and no known apparatus has for its object, as is the case with my invention, the formation of a coherent "white" jet, this being due to the fine division of the air and to the formation of a true suspension of a multitude of air bubbles in the water.

In the preferred embodiment of my invention, the water is introduced into the mixing chamber through a plurality of apertures. Also I find that a highly efficient form of dividing means is a fine screen located at the outlet, and I have found that even better results can be obtained if two or more superposed screens are used in the outlet discharge. The size of the mesh employed is not critical but I have obtained good results where the holes in the screen measured about .6 square millimeter.

Such a screen finely breaks up the water and offers sufficient resistance for thoroughly mixing it with air. On the other hand, the resistance of the screen is low enough to permit passage of the air in the form of bubbles disseminated in the water. The streamlets of aerated water are sufficiently close together, so that on issuing, they join each other to form a single jet.

My invention can readily be understood by reference to the accompanying drawing, in which Fig. 1 is a sectional view of a device embodying my invention which is shown as attached to an ordinary water faucet through the medium of a connecting device such as is described in my Patent No. 2,071,780; Fig. 2 is a sectional view of a device adapted to be screwed onto an ordinary water pipe; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a sectional view showing a further modified form; Figs. 5, 6, 7 and 8 are additional sectional views showing further modifications; and Fig. 9 is a section on line 9—9 of Fig. 8.

Referring now to Fig. 1, 10 designates an ordinary faucet or tap. 12 is a tap connector, the operation of which is described in detail in my patent above referred to. 14 is the casing of the mixing device enclosing the primary mixing chamber. The perforated screen 16 admits the water into the casing 14 in the form of a plurality of jets. A plurality of air ports 18 are provided for admission of air into the interior of the casing 14. 20 is a screen at the lower part of the casing, and below the screen 20 the casing narrows to form a passage 22.

When the water is turned through this device, if the faucet is opened only slightly, so that very little kinetic energy is developed in the water, as it emerges from the perforations in the screen 16, in proportion to the resistance of the screen 20, then the water will come out of the discharge 22 without air bubbles. On the other hand, as the faucet is opened wider, the velocity of the water emerging from the perforations in the screen 16, increases and acquires the necessary kinetic energy relative to the resistance of the screen 20, to effect entrainment and mixing of the air with the water.

While the total cross sectional area of the per-

2 App. 134

forations in the screen 16, under the usual conditions of operation, is such as to force the water into the chamber with substantial velocity and the screen 20 has the proper relative resistance thereto, to effect the desired result, it is obvious that any change in the cross sectional area of the perforations in the screen 16 will require a change in the resistance of the screen, to establish the proportion necessary for the maintenance of substantially the same result. This water, again contacting with the screen 20, will pass through the screen with the air and emerge from the outlet 22. As the diameter of outlet 22 is substantially greater than the aggregate diameter of the perforations in screen 16, the water will have relatively low velocity as it comes out from the discharge.

When my device is functioning, the water, due to the thorough admixture of air, has characteristics which are surprisingly different from those of water as ordinarily discharged from a faucet. For example, if one's hand is put in the course of the water, the water will flow evenly and uniformly over the surface and will wet the entire surface without splashing. Also it will be found that if the discharge from such faucet is allowed to flow into a weak soap solution, it will make an extraordinary amount of foam, which will be found very useful for washing; for instance, when washing clothes or dishes. Again it will be found that the introduction of the air into the water will raise its dissolved oxygen content and the aeration tends to remove objectionable odors and gases from the water, rendering it more palatable. These effects are apparently due to the extreme thoroughness with which the aeration takes place in my device and the results are quite different from the results obtained by ordinary injection devices in which the air is not thoroughly broken up so that when the two fluids leave the apparatus, the air quickly separates from the water jet.

In the form of device shown in Fig. 2, a metal casing 24 is screwed directly onto the faucet 11. This casing holds the screen 20 against the mouth of the faucet and the casing is provided with an outlet screen 28. A series of ports 30 are provided in the casing to admit air in a manner similar to that already described in connection with Fig. 1.

In Fig. 4 the casing 32 is provided with a union coupling 34 for connection to an ordinary hose bib. The screen 36 is clamped between the casing 32 and the mouth of the hose bib. Air is admitted to the interior of the casing by a series of horizontal perforations 38. In this case two screens are provided at the outlet as indicated at 40 and 42, which will cause the air bubbles in the water to be somewhat smaller than where only a single screen is employed.

Fig. 5 illustrates a case where a single aperture is employed for admitting fluid to the chamber. In this figure, the casing 44 is screwed to the faucet 46 and clamps in place a plate 48 having a single aperture in the middle. A plate 50 supported by legs 52 is positioned in the lower part of the chamber and below this is positioned a screen 54. The water from the aperture in plate 48 strikes plate 50 and due to its kinetic energy the stream is broken up and thoroughly mixed with the air.

In Fig. 6 the plate 56 has a plurality of holes near the periphery and the casing 58 is formed with inwardly extending projections as indicated at 60. The principal part of the water coming through the openings in the plate 56 will strike these projections and be broken up as previously described. In this case, a screen 62 is also used in the device.

An effect similar to that shown in Fig. 6 is illustrated in Fig. 7 except that instead of having a plurality of apertures in the plate, the plate 66 has a single central orifice shaped to throw the water outwardly. The casing 68 again has projections as indicated at 68 similar to the projections 60 described above.

Another form of my device is shown in Figs. 8 and 9. In this arrangement it is possible to mix three fluids, one of which is under pressure. Leading into a mixing chamber 72 are a plurality of passages 74 to permit entrance of a fluid under pressure into the mixing chamber 72 enclosed by casing 76. The inlet port 76 intersects and leads into one group of passages 74 near the upper end of the passages; and another inlet port 77 likewise intersects and leads into another group of passages 74. The inlet ports 76 and 77 do not connect with one another; in consequence the channels 74 are grouped into two sections, each section being connected to an inlet port. In this form of my device each inlet port may admit a different fluid into the mixing chamber. The cross-sectional area of passages 74 is greater after intersection by inlet ports 76 and 77 and the cross-sectional area of the passages continues to increase as the passages approach the mixing chamber. As in preceding examples, the fluid under pressure courses through passages 74 and draws fluids from inlet ports 76 and 77 into the enlarged portion of passages 74. Baffles 78 project into the passages at the point where the passages discharge into the mixing chamber. The baffles in part interrupt the course of the fluids in each passage and thereby serve to effect a preliminary mixing of the fluids. Within the mixing chamber two screens 80 in spaced relation are placed across the path of the fluids emerging from the passages 74 to interrupt abruptly the course of all such fluids and thereby cause the fluids to mix and sub-divide into minute particles. The fluids are discharged through the outlet 82.

While I have referred to perforated upstream plates and downstream screens, it is possible to use perforated plates or (except in certain forms) screens in either position. In the various forms of device shown, the screens and the plates forming the apertures are made readily removable so that the devices can easily be claimed.

What I claim is:

1. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

2. A device for producting a coherent jet of water containing air bubbles, comprising a cham-

ber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and means for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

3. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet, the resistance offered by the said means and the cross sectional area of the orifice being proportioned to effect the entrainment and mixing of the air with water before their discharge from the said outlet end.

4. The device of claim 1 in which the said means comprises a screen at the discharge end of the chamber, the openings in which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

5. The device of claim 1 in which the said means comprises superposed screens, the screen at the discharge end of the chamber having apertures which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

ELIE AGHNIDES.

☆☆☆☆☆☆☆☆☆☆☆

☆☆☆☆☆☆☆☆☆☆☆

CERTIFICATE OF COMMISSIONER OF PATENTS OF THE UNITED STATES PATENT OFFICE CERTIFYING THAT THE ANNEXED IS A TRUE COPY FROM THE RECORDS OF THAT OFFICE OF THE FILE WRAPPER AND CONTENTS OF PATENT 2,316,832, GRANTED APRIL 20, 1943 TO ELIE AGHNIDES FOR FLUID MIXING DEVICES.

Seal

Signature

☆☆☆☆☆☆☆☆☆☆☆

☆☆☆☆☆☆☆☆☆☆☆

Note

Page 2 App. 136 is blank;

Pages 2 App. 137-143 are on Card 8;

Pages 2 App. 144-145B are on Card 11.

Note

Pages 2 App. 147-152 are on Card 11;

Pages 2 App. 153-162 are on Card 12;

Pages 2 App. 163-167 are on Card 13.

Printers error in page numbering

Note

Pages 2 App. 167B-171 are on Card 13;

Pages 2 App. 172-181 are on Card 14;

Pages 2 App. 182-191 are on Card 15;

Pages 2 App. 192-197 are on Card 16;

Pages 2 App 198-199 follow this frame.

2 App. 205

April 20, 1943. E. AGHNIDES 2,316,832

FLUID MIXING DEVICE

Filed April 5, 1940

FIG. 1.

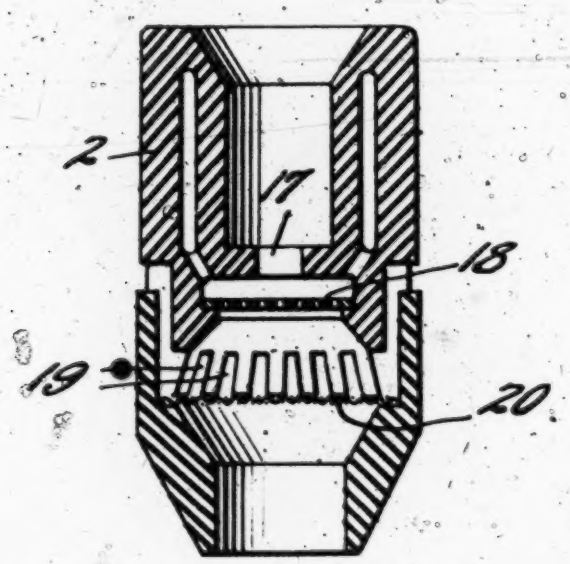


FIG. 2.

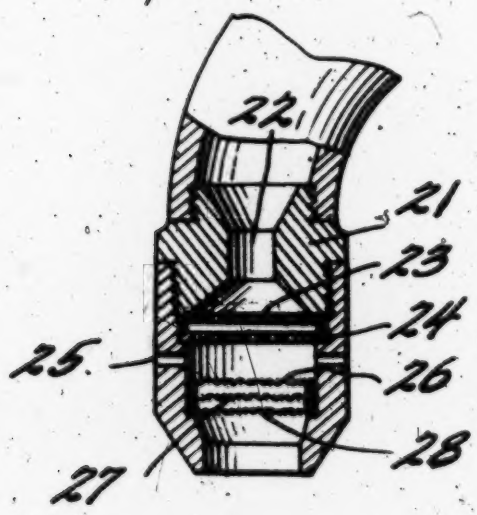
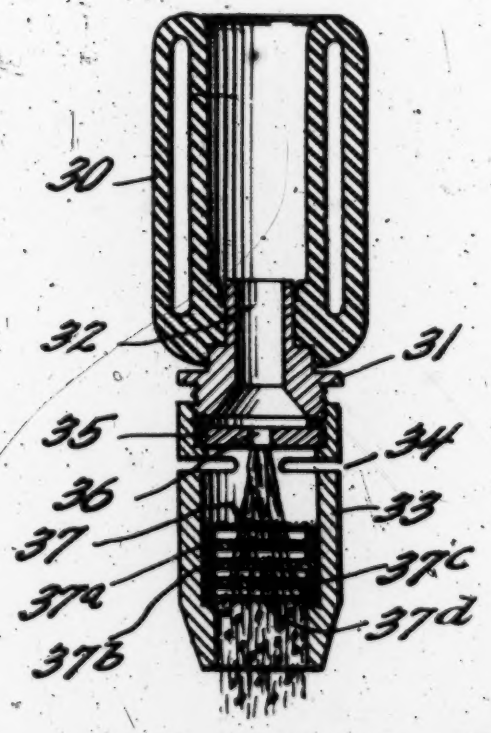


FIG. 3.



Inventor

Elie Aghnides,

By John Boyle Jr.

Attorney

2 App. 207

Patented Apr. 20, 1943

2,316,832

(Page 2 App. 206 is blank.)

UNITED STATES PATENT OFFICE

2,316,832

FLUID MIXING DEVICE

Elio Agbuddoo, New York, N. Y.

Application April 5, 1940, Serial No. 328,128
In Belgium December 4, 1934

4 Claims. (Cl. 261—76)

My invention relates to a device for intimately mixing a large volume of a gas, such as air, with a liquid such as water, and ordinarily is used for producing a jet of water containing air bubbles disseminated throughout the jet and is an improvement on my Patent 2,210,946 granted Aug. 6, 1940. Such a jet is whitish in appearance, soft and light to the touch and possesses numerous advantages not found in the ordinary water jet as discharged from a faucet.

Generally speaking, my invention consists therefore of a device comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube, such as an ordinary household water faucet, containing water under the normal main pressure of about 3 atmospheres. The outlet end of the device is adapted to discharge a coherent jet containing air bubbles disseminated throughout the jet. At the upstream end of the chamber is an apertured diaphragm through which the stream of water is adapted to be forced into the chamber with substantial velocity. An air port opening into the chamber is provided through which air is induced by the stream of water. At least one foraminous screen is provided in the path of the stream of water after it leaves the apertured diaphragm and before it discharges at the outlet end, for finely breaking up the stream of water which is thoroughly mixed with the air.

Means are provided for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet. This may be in part, a multiplicity of orifices in the upstream diaphragm; or in the addition of at least a second foraminous screen between the first screen and the outlet end, with openings so close to each other that the issuing aerated water unites to form a coherent jet; or, in the addition of a tubular portion at the outlet end and adapted to contract the stream of aerated water issuing from the screen, to form a coherent jet.

Referring to the drawing

Fig. 1 is a vertical section of one form of my invention.

Figs. 2 and 3 are similar sections of modified forms.

In Fig. 1, I employ the same type of rubber tap connector 2 as in Fig. 1 of my aforesaid patent, except that I provide a constricted orifice 17, above the upstream apertured diaphragm 18, and the air inlets 19 terminate close to the surface of the downstream screen 20.

In Fig. 2, I employ a screw coupling 21 having a restricted orifice 22 for connecting my device to a faucet and I employ two spaced apertured diaphragms 23, 24 located above the air inlets 25 and I use three spaced screens 26, 27, 28, in the downstream end of the device.

In Fig. 3, I employ the same general type of rubber tap connector 30 as in Fig. 1. The metal coupling 31 having a restricted orifice 32 is secured thereto. Screwed to the coupling is the lower portion 33, provided with air inlets 34, an upstream diaphragm 35 having a single orifice 36 and five spaced wire screens 37, 37a, 37b, 37c, and 37d. The number of screens used depends on the orifice area, the distance between the diaphragm and screens and the mesh of the wire screens.

I have found that when the water is discharged through a restricted orifice, as at 17, Fig. 1, at 22 Fig. 2, and at 32 Fig. 3 that the flow through the orifices in the upstream diaphragm is improved and a more regular and softer jet is delivered from the outlet end of the device.

A similar result is obtained when instead of the restricted orifice upstream of the diaphragm, a second foraminous diaphragm as 23, Fig. 2, preferably with greater aggregate cross section of the foramina, is located upstream of the first diaphragm 24, at a distance of about 1 mm. Both the restricted orifice and the second diaphragm can be used together for a more uniform flow of the bubbly jet.

This application is a continuation in part of my applications Ser. No. 183,894 filed Dec. 31, 1937 patented August 6, 1940, Number 2,210,946 and Ser. No. 53,938 filed Dec. 4, 1935.

I claim:

1. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a foraminous member upstream the apertured diaphragm.

2. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the

Note

Pages 2 App. 200-203 are on Card 16;

Page 2 App. 204 is on Card 17.

2 App 208

outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice upstream the apertured diaphragm.

2. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice and foraminous member upstream the apertured diaphragm.

4. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, superposed apertured diaphragms at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragms and means in the path of the stream of water after it leaves the apertured diaphragms and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles.

ELIE AGHNIDES.

Note

Pages 2 App. 209-218
are on Card 17.

Defendant's Exhibit 14 . 2 App. 219

PATENT SPECIFICATION

Convention Date (Belgium): Dec. 8, 1934.

468,687

Application Date (In United Kingdom): Dec. 6, 1935. No. 33884/35.

Complete Specification Accepted: July 6, 1937.

COMPLETE SPECIFICATION

Device for Intimately Mixing Air with a Liquid Flowing under Pressure

I, ELIE AGHNIDES, a Greek subject, of 16, rue Capouillet, Brussels, Belgium, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a device for intimately mixing air with a liquid flowing under pressure.

The device according to the invention comprises an injector portion provided upstream of the part where it aspirates air with a perforated cross partition that divides the stream of liquid into a number of small streams, and downstream the said part with an atomizing and mixing portion comprising one or more finely perforated plates, so that the resulting jet has a substantially uniform pressure throughout its cross section and consists of a uniformly distributed, finely broken mixture of liquid and air having the particles of liquid and air in intimate contact with each other even after issuing from the said device.

It has been proposed to provide a liquid aerating device comprising a tubular member having a lower hollow part and a relatively solid upper part in which were arranged liquid passages alternating with short passages communicating with atmosphere at the sides of the device, whilst the lower hollow part supported a number of pegs below and transverse to the liquid posal was designed as a device for exhausting air or gases from a chamber or space.

Owing to the invention atmospheric or surrounding air can be intimately mixed with a flowing water column under pressure to obtain at the outlet of the device a good water and air mixture. The mixture thus obtained possesses remarkable qualities: the water thus charged acquires an agreeable flavour, like water coming from a natural spring; this water is more digestive, it softens the skin and, due to the simultaneous and automatic introduction of intimately mixed air, produces with soap a very foamy emulsion which means better washing and a considerable economy of soap and time, for instance when washing clothes. The enriching of the water confers to the water a higher oxidising power.

Another practical application consists, for instance, in drawing off beer. Repeated experiments have proved that beer caused to flow by carbon dioxide under pressure and compelled to run through the device according to the invention is intimately mixed with the surrounding air, acquires a better taste and a finer appearance, the foam being more resistant.

The invention can be carried into effect in various manners.

In the accompanying drawings:—

Fig. 1 is an axial cross-section of a water aerating device for a domestic water pipe.

intimately mixing air with a liquid flowing under pressure.

The device according to the invention comprises an injector portion provided upstream of the part where it aspirates air with a perforated cross partition that divides the stream of liquid into a number of small streams, and downstream the said part with an atomizing and mixing portion comprising one or more finely perforated plates, so that the resulting jet has a substantially uniform pressure throughout its cross section and consists of a uniformly distributed, finely broken mixture of liquid and air having the particles of liquid and air in intimate contact with each other even after issuing from the said device.

It has been proposed to provide a liquid aerating device comprising a tubular member having a lower hollow part and a relatively solid upper part in which were arranged liquid passages alternating with short passages communicating with atmosphere at the sides of the device, whilst the lower hollow part supported a number of pegs below and transverse to the liquid passages. The present invention differs from this proposal in that the said invention provides a perforated plate or plates which atomize and mix the aid and liquid in the manner set forth in the preceding paragraph.

In apparatus for exhausting air or gas it has been proposed to employ a number of perforated plates in a flow passage for water mixed with air or gas aspirated by the water. The device according to the present invention differs from this proposal, however, in that it has a perforated cross partition upstream of the part where air is aspirated so that the liquid is divided into a number of separate passages, and whereas the present device is designed to aerate liquid the said properties: the water thus charged acquires an agreeable flavour, like water coming from a natural spring; this water is more digestive, it softens the skin and, due to the simultaneous and automatic introduction of intimately mixed air, produces with soap a very foamy emulsion which means better washing and a considerable economy of soap and time, for instance when washing clothes. The enriching of the water confers to the water a higher oxidising power.

Another practical application consists, for instance, in drawing off beer. Repeated experiments have proved that beer caused to flow by carbon dioxide under pressure and compelled to run through the device according to the invention is intimately mixed with the surrounding air, acquires a better taste and a finer appearance, the foam being more resistant.

The invention can be carried into effect in various manners.

In the accompanying drawings:—

Fig. 1 is an axial cross-section of a water aerating device for a domestic water pipe.

Fig. 2 to 5 are diagrams of various forms of the invention.

In Figure 1, the numeral 1 indicates for instance a water pipe under pressure and 2 a tap of any type whatever. A tubular part 3 is fixed at the end of the tap; the connection can be made in any desired manner provided that it is tight, and in the example this is realized by means of a special self tightening connection 4 according to the Specification of my British Patent Application No. 15918/35 (451,142).

The tubular part is provided with and closed inside by means of a transversal partition 5 provided with holes 6 the object of which is to divide the current of water to increase the contacting surface between

[*Price* 1/-]

Price 3s. 0d.

the water and the air; the total section or surface of the holes is smaller than the section through which the fluid flows at the end of the tap. Below the partition 5, in respect to the current of water, the side wall of tube 3 is provided with a ring of holes 7.

The manner in which the device works will be immediately understood.

Numeral 9 represents diagrammatically two perforated plates or any other dividing devices, to form one or several chambers or spaces ensuring atomisation of the fluids and uniformity in the mixture before its exit.

The total area of the holes in the partition 5 may be equal to the area of the annulus (Fig. 5) or the total area of the holes 7 through which the incoming air or gas passes (Fig. 1). The holes 7 may be replaced by a complete interruption of the tubular wall as is the case in Figures 2 to 5.

In Figure 2, the lower pipe 20, which is larger than the pipe above, comes to an end in front of the latter in the form of a contracting-expanding part 21. In Figure 3, the device is manifold and comprises several stepped air admission rings, and in Figure 4, which corresponds to Figure 3, the piping above and the piping below are jointed by a clip or by means of flanges 23 allowing the air to pass. The embodiments illustrated in these figures have the perforated partitions 5 on the upstream side of the devices and perforated plates 9 on the downstream side.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. A device for intimately mixing air with a liquid flowing under pressure, comprising an injector portion provided upstream of the part where it aspirates air with a perforated cross partition that divides the stream of liquid into a number of small streams, and downstream the said part with an atomising and mixing portion comprising one or more finely perforated plates, so that the resulting jet has a substantially uniform pressure throughout its cross section and consists of a uniformly distributed, finely broken mixture of liquid and air having the particles of liquid and air in intimate contact with each other even after issuing from the said device.

2. Device according to claim 1, substantially as herein described with reference to the accompanying drawings.

Dated this 5th day of December, 1935.

HY. FAIRBROTHER,
Chartered Patent Agent,
30 & 32, Ludgate Hill, London, E.C.4.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1937

Defendant's Exhibit 15 also 44-5 2 App.221

May 30, 1933. E. AGHNIDES 1,912,113

WATER PUMP

Filed June 11, 1931

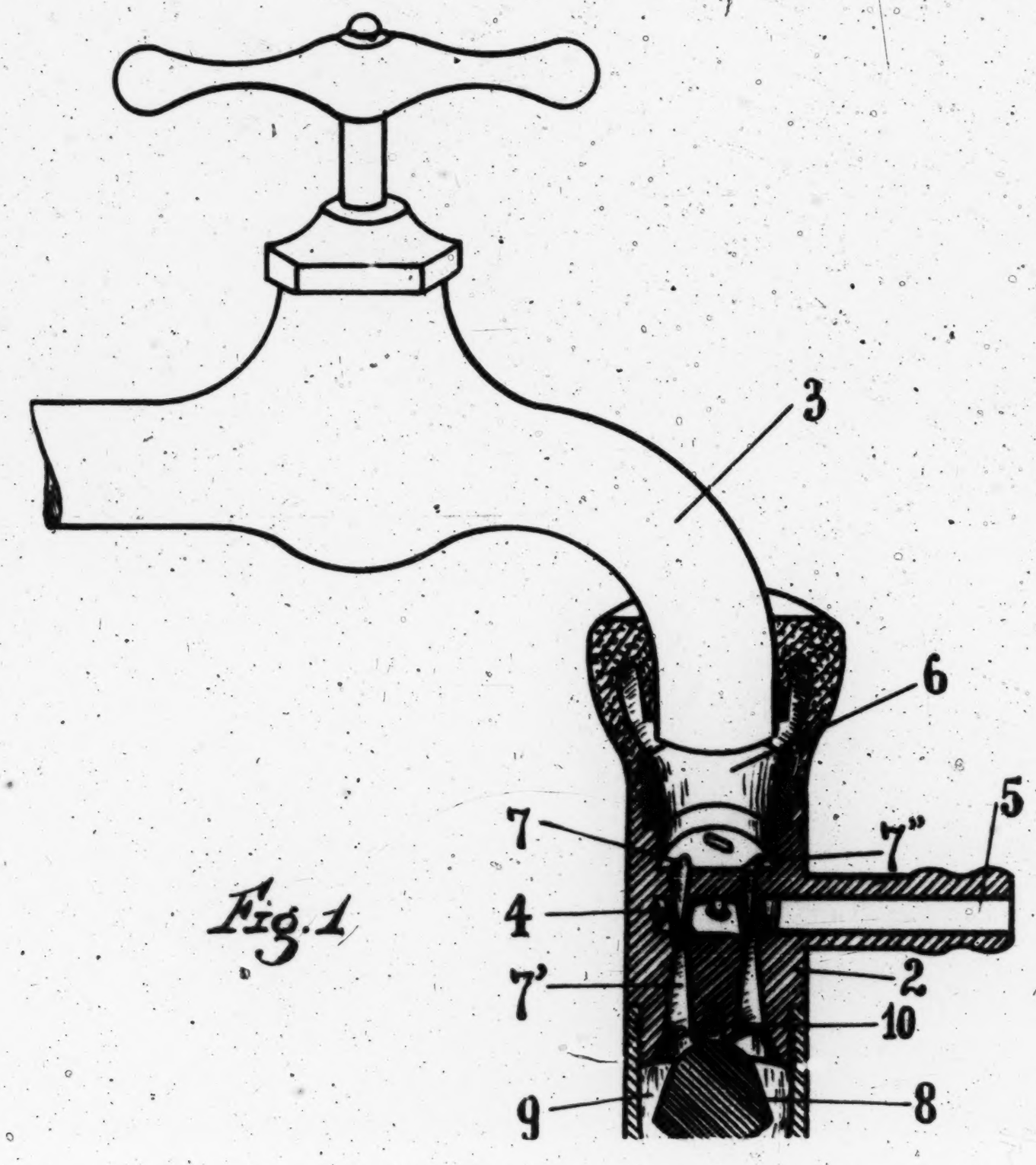


Fig. 1

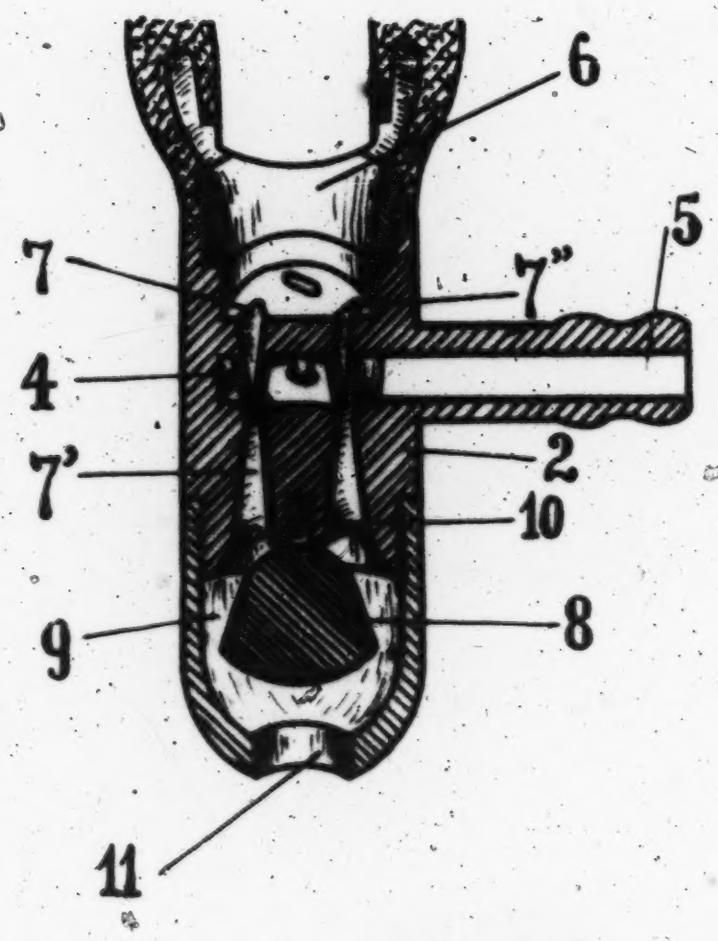


Fig. 1

Fig. 2

Inventor:
Elie Aghnides
by his Attorney:

Defendant's Exhibit 15 also 44-5 2 App. 223
(p. 2 App. 222 is Blank)

Patented May 30, 1933 1,912,113

UNITED STATES PATENT OFFICE

ELIE AGNIDES, OF ANTWERP, BELGIUM

WATER PUMP

Application filed June 11, 1931, Serial No. 542,926, and in Belgium June 13, 1930.

This invention relates to water pumps adapted to produce a depression in a vessel or space, by the known suction effect of water in a nozzle.

One object of the invention is to do away with the very long or long outlet tube that it was always necessary to provide to prevent the inrushing back of air into the vacuumized vessel. In order to attain this I provide an arrangement by which the jets of mixed water and gas are directed in an annular space or canal such that the transverse section of the central portion of the same, considered in the same direction as the flow of water and gas first increases, then diminishes to become in the end null.

Also the exterior contour of the said annular space or canal, considered in the direction of the flow of water and gas first comes nearer or converges to the said central portion, then diverges from the same.

Also it is provided an outlet having a section smaller than the largest transverse section of the said central portion.

One realizes in that manner a particular path for the liquid, path which is characterized in that it is curved without breaking or fragmenting the flow of liquid.

According to this invention such an annular canal is realized by providing in a canal of no particular shape a pear-shaped deflector which provides the said central portion and which has a transverse section first augmenting, thereafter decreasing to become finally nil.

I have illustrated a form of realization of this invention by way of example only in the accompanying drawing in which:

Fig. 1 is a perspective view partly in section of my improved water pump.

Fig. 2 shows a modified form of the deflector.

In Fig. 1 the water jet 1 is mounted on a tap 2 and comprises an air chamber 4 connected by a pipe 5 to a vessel or space, not illustrated, and in which vacuum is to be made.

The flow of liquid projected into 6 is divided in several jets by conduits such as 7 or 7'' having a section converging towards the air chamber 4. These jets are directed into conduits 7' which have a section diverging towards the outlet.

The conduits 7, 7', 7'' have a section other than circular, so as to provide a larger surface of contact between the water and the air in chamber 4. In Fig. 1 the canal 7'' is the most clearly visible, having a very elongated section, which may be elliptical or rectangular, whereas conduit 7 is triangular in section.

The conduits 7' lead into an annular canal 9, the central solid portion 8 of which has a section which first increases, then decreases to become nil, taking the direction of the flow of fluid. The said central portion 8 is constituted by a pear-shaped deflector, secured, for instance screwed, by a projection 10, and having a transverse section such as aforesaid.

It is obvious that in view of increasing or decreasing the said shape of the circular canal 9 the exterior wall thereof can be made concave and/or convex.

In order to provide a further curved path for the liquid, the canal 9 is provided with an outlet opening 11 smaller than the largest section of the said central portion and provided of course below the said central portion.

By this means it has been found that although with the very short length of the jet, and without a supplementary evacuation pipe, no air could enter by the outlet to return to the vacuum chamber, and the efficiency of the apparatus is very much increased.

I may also provide a somewhat modified pear-shaped deflector according to Fig. 2, that is, having a bottom or outlet face concave or cup-shaped. This cup designated by 12 has for effect to prevent still more efficiently any retrogradation of the air, the air filets coming back into the apparatus being immediately directed and stopped in the centre of said cup 12.

Preferably the outlet 11 will be provided with a wire gauze acting as anti-spout device.

I wish to point out that my invention is not to be considered as restricted to these particular forms of construction illustrated, and other forms may be considered, as long as

2 App. 224

Defendant's Exhibit 15 also 44 5

they are within the scope of the following claims.

Having now fully described my said invention, what I claim and desire to secure by Letters Patent, is:

1. A water jet pump comprising a tubular body, air suction pipes leading into a chamber in said body, a plurality of water conduits leading into said chamber, a plurality of air and water conduits leading from said chamber into an annular conduit providing a converging passage, subsequently a diverging passage for the mixture of fluids, and an outlet opening immediately after said diverging passage.

2. A water jet pump comprising a tubular body, an air suction pipe leading into a chamber in said body, a plurality of water conduits leading into said chamber, a plurality of air and water conduits leading from said chamber into a fluid laminating annular passage, a pear shaped deflector provided in said passage, and an outlet having an opening smaller than the largest diameter of the said pear shaped deflector.

3. A water jet pump comprising a tubular body, an air suction pipe leading into a chamber in said body, a plurality of water conduits leading into said chamber, a plurality of air and water conduits leading from said chamber into a fluid laminating annular passage, a pear shaped deflector secured centrically in said passage and having a concave outlet side, an outlet having an opening smaller than the largest diameter of the said pear shaped deflector.

ELIE AGHNIDES.

Note

Page 225 is on
Card 18.

800

2 App. 226 Defendant's Exhibit 25

[Page 2 App. 227 in Card 18]

NAME & DESCRIPTION OF PART

#800 SOFTFLO ASSEMBLY

NATURE OF CHANGE

Add 1 disc 1-129
1 gasket 1-130
1 screen 1-124
1 separator ring 1-126

REASON FOR CHANGE

To improve stream

ESTIMATED COST OF CHANGE

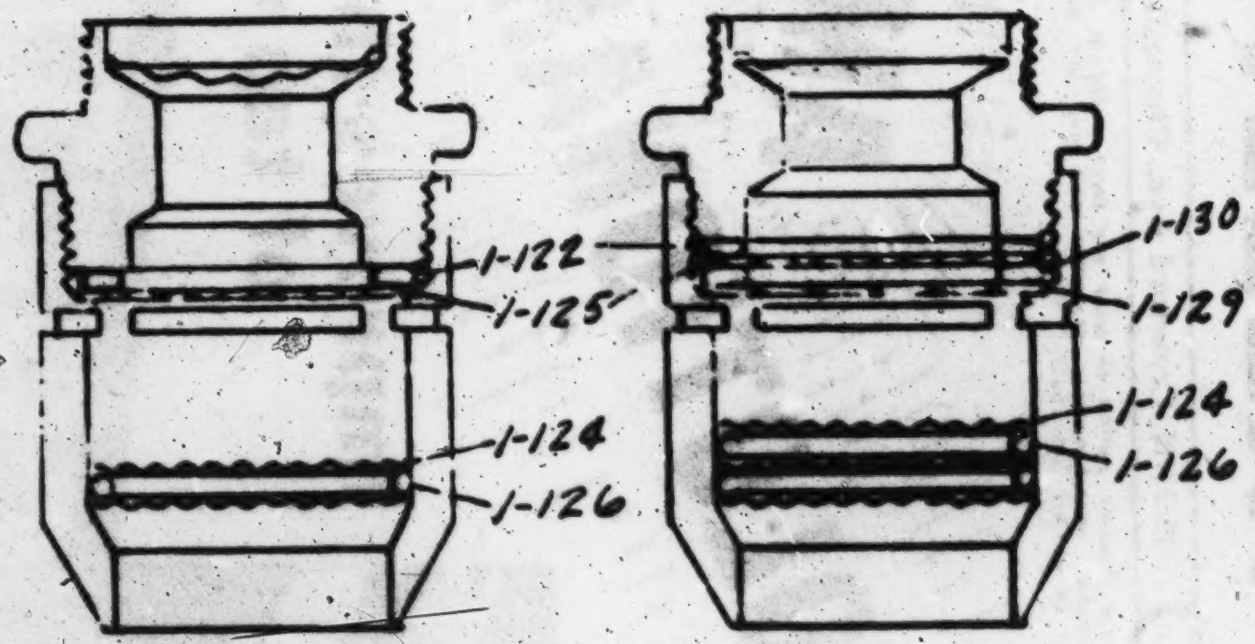
SEE C.O. 1-121-K

OTHER PARTS AFFECTED

1-121 See Change order

REMARKS -

CHANGE ORDER NO. 1
DATE 2-5-40
OLD PART NO. 800
OLD DRAWING NO. 800-A
NEW PART NO.
NEW DRAWING NO.
QUANTITY OF OLD PARTS ON HAND
EFFECTIVE DATE OF CHANGE



PRESENT PROPOSED

SCALE 2" = 1"

SUGGESTED BY H. Steen APPROVED BY ACB

DRAWINGS CHANGED BY H.A.T. MATERIAL SHEETS BY

THE CHICAGO FAUCET COMPANY
2700 TO 2722 NORTH CRAWFORD AVENUE
CHICAGO

2 App. 228 **Defendant's Exhibit 34**

13

ADR TELEGRAPHIQUE
OXYJET-BRUXELLES

E. P. AGHNIDES

14, BOULEVARD DE WATERLOO BRUXELLES

TELEPHONE 11'38 00
CH POST 1870 14

VITA JET

February 14, 1938.

VOTRE REF

NOTRE REF

THE CHICAGO FAUCET COMPANY,
2700 to 2722 North Crawford Avenue,
Chicago.-

Dear Mr Brown,

On my return from a trip I found your letters of February 4, 9 and 17, contents of which are duly noted.

Guaranty Trust Company.- The sums you remitted have been transferred to me and I informed you in a previous letter that all payments must in future be made to the Banque Belge pour l'Etranger (Overseas) Ltd, 67, Wall Street, New York City.

This bank is the branch office of my bank in Belgium, that is why I quitted the Guaranty Trust of New York.

Your ad in the "Chicago Faucet News".- The page you arranged is really very striking and the name you adopted is successful.

The version as arranged by you seems to me all right. You better know the American mentality and simply as a mere suggestion I will send you a draft, for your guidance, in the way I visualize an ad of this kind.

CHICAGO FAUCETS
MAR 22 1938
RECEIVED

Chemists' report.- Enclosed please find a copy of the report on oxy-jet by Messrs Bull and Roberts, of New-York.

I am looking forward to receive your "softflo" faucet which I hope will really be revolutionary.

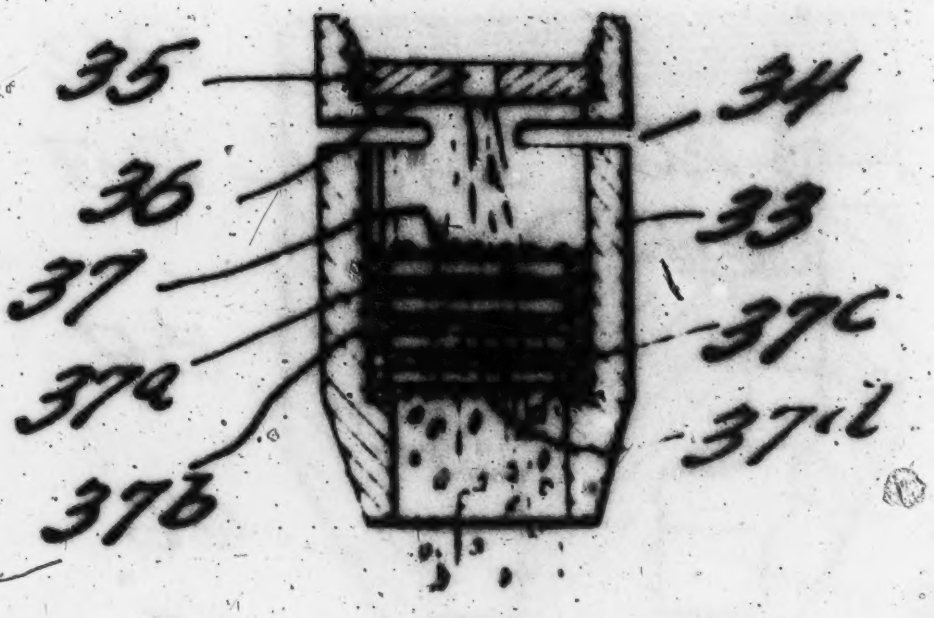
With best regards.

Yours faithfully,

Encls.

Elie Aghnides

Deft's Ex 34


35
34
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37c
37a
37d
37b

Defendant's Exhibit 40

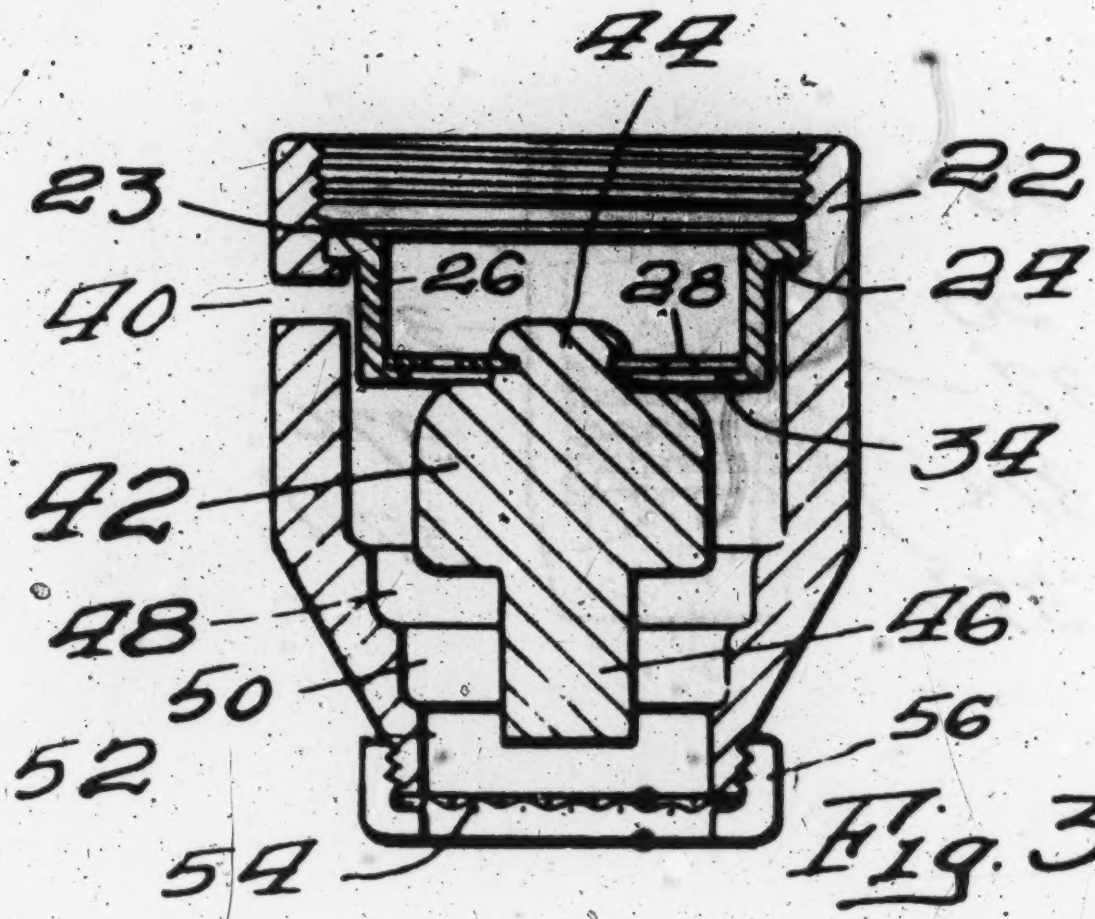

Fig. 3.

* * *

Authenticating Certificate of Consul of the United States of America of London England.

* * *

THE PATENT OFFICE,
25, SOUTHAMPTON BUILDINGS,
LONDON, W.C.2,
ENGLAND.

I, the undersigned being an officer authorised in that behalf by the Board of Trade, hereby certify that the annexed (document 'A') are true copies of the complete specification and drawings, as placed open to public inspection on the 9th June, 1936, under the provisions of Section 91(4) of the Patents and Designs Acts, 1907 to 1932, in connection with the application for Patent of Elie Aghnides No. 33,884 of 1935, made on the 6th December, 1935, under the provisions of Section 91 of the said Acts.

I also certify that in pursuance of a request made under Section 79(2) of the Patents Act, 1949, the information given on the annexed document, marked 'B' regarding the specifications cited as the result of a search made under Sections 7 and 8 of the said Act, 1949, in connection with Patent No. 468,687 was furnished; and that such information is a true transcript from the report made by the Examiner.

Witness my hand this 3rd day of November 1955.

(Signature)

Seal

* * *

2 App. 144 Plaintiff's Exhibit 16

AO Form 120

In Re Patents

United States District Court

for the

S. D. N. Y.

COMMISSIONER OF PATENTS,
Washington 25, D. C.

SOLICITOR

SIR:

SEP 21 1954

In compliance with the Act of February 18, 1922 (42 Stat. L. 392; 35 USC 70), you are advised that there was filed on the 16th. day of September U. S. PATENT OFFICE, 19 54, in this court an action, suit, or proceeding No. Civ. 95-355, entitled:

Name Melard Manufacturing Corporation, Plaintiff,

Address New York

versus

Name Elie P. Aghnides, Defendant,

Address New York

B

brought upon the following patents:

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,210,846	Aug. 6, 1940	Aghnides
2	2,316,832	Apr. 20, 1943	Aghnides
3			
4			
5			

In the above-entitled case, on the ..... day of ....., 19 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree issued:

.....

.....

WILLIAM V. CONNELL, Clerk

Date Sep. 20, 19 54. By ....., Deputy Clerk

182584

Form 789

UNITED STATES DISTRICT COURT
District of Northern Illinois - Eastern Division

DISTRICT OF NORTHERN ILLINOIS - EASTERN DIVISION

[illegible]TOR

HONORABLE COMMISSIONER OF PATENTS,
Washington, D. C.

DEC 31 1954

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 19th day of July, 19[illegible]50 in this court an action, suit, or proceeding No. 50 C 1022, entitled:

Name ELIE P. AGHNIDES, Plaintiff,

Address 46 West 54th Street, New York 19, N.Y.

versus

Name CHLONY W. HOLDEN and MARGUERITE HOLDEN, a corp., d/b/a KNICKERBOCKER RUBBER COMPANY, Defendant,

Address 6101 S. May Street, Chicago 21, Illinois

brought upon the following patents:

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,210,896	August 6, 1940	Elie P. Aghnides
2			
3			
4			
5			

In the above-entitled case, on the ..... day of ....., 193 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree issued:

[illegible] final judgment entered in favor of defts and against plff

[illegible] issue invalid and dismissing complaint - DRAFT - Judge Knoch

IN WITNESS WHEREOF I have affixed my hand this 29th day of [illegible]ecember, 193[illegible]54, at Chicago, Illinois.

[illegible]
Clerk of said Court.

187884

Plaintiff's Exhibit 16

AO Form 120

In Re Patents

United States District Court

for the

NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

COMMISSIONER OF PATENTS,
Washington 25, D. C.

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392; 35 USC 70), you are advised that there was filed on the 18th day of JANUARY, 1955, in this court an action, suit, or proceeding No. 55C 84, entitled:

Name MELARD MANUFACTURING CORPORATION, Plaintiff,

Address 432 Austin Place, New York

versus

Name CHASE BRASS & COPPER CO., INC., Defendant,

Address Waterbury Connecticut and doing business in Chicago, Illinois

brought upon the following patents:

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,210,816	August 6, 1940	Elie P. Aghnides
2	2,316,832	April 20, 1943	Elie P. Aghnides
3			
4			
5			

In the above-entitled case, on the ..... day of ....., 19 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree issued:

Date January 18, 1955

By R. Sommers, Clerk
Deputy Clerk

18204

421

1937

CONTENTS:

	Application ..... papers.	JAN 5 1938
2.		Dec 21-1937
3.		Dec. -1937
4.		MAR 21 1938
5.		Dec 15-1938
6.		JUN 23 1938
7.		[illegible]
8.		[illegible]
9.		MAY 11 1939
10.		MAY 1
11.		JUL 14 1939
12.		[illegible]
13.		[illegible]
14.		[illegible]
15.		(Expire Sept)
16.		[illegible]
17.		JAN 13 1940
18.	Notice of Acceptance & Letter	JAN 18 1940
19.		[illegible]
20.		JAN
21.	EXAMINER'S STATEMENT	
22.	Hearing	June 3-1940
23.	Brief	June 3, 1940
24.	BRIEF	JUN - 1940
25.	DECISION BY BOARD	JUN 18 1940

26.		June 3 - 1940
27.		[illegible]
28.		[illegible]
29.		[illegible]
30.		[illegible]
31.	Notice of Suit	July 26-1950
32.	Notice of Suit	Sept 19-1950
33.	Notice of Suit	Mar 4-1953
34.	Notice of Suit	June 5-1953
35.	Notice of Suit	May 27-1953
36.	Notice of Suit	Apr. 19, 1954
37.	Notice of Suit	Aug. 5-1954
38.	Notice of Suit	Sept. 21-1954
39.	Notice of Suit	Dec. 31-1954
40.	Notice of Suit	Jan. 19-1955
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Plaintiff's Exhibit 17 2 App. 147

PATENTED FILE
RETURN TO RECORD ROOM

NUMBER (Series of 1935)

328120

DIV. 3432

1940

PATENT No. 2316832

DATED APR 20 1943

(EX'R'S BOOK)

Name ELIE P. AGHNIDES

of NEW YORK,

State of ~~NEW YORK~~

Invention FLUID MIXING DEVICES

ORIGINAL

APPLICATION FILED COMPLETE APR 5, 1940

PARTS OF APPLICATION FILED

Petition, Specification, Oath, First Fee $30 — APR 5, 1940

1 sheets Drawings,

Examined and passed for Issue Dec 23, 1942

Notice of Allowance

Final Fee

Attorney JOHN BOYLE, JR 801 WASHINGTON LOAN & TRUST BLDG CITY.

Associate Attorney

No. of Claims Allowed 2 Print Claim

Title as allowed Fluid [illegible]

Division of App., No.

BELGIUM DEC 4 1934

APPLICATION FOR U. S. LETTERS PATENT
ALL RIGHTS RESERVED

Law Reporter Blank No. 601
518 FIFTH ST. N.W., WASHINGTON, D. C.

PETITION

328120

To the Commissioner of Patents:

Your petitioner (1) Elie F. Aghnides

citizen of the Greek Republic residing at New York City in the County of New York and State of New York and whose post-office address is 609 West 158th St., New York City

prays that Letters Patent may be granted to him for the improvement in Fluid Mixing Devices

set forth in the annexed Specification.

And he hereby appoints (2) John Boyle Jr.

U.S. PAT
APR 1
DIVIS

of 801 Washington Loan & Trust Bldg Wash. D.C.

Register No. 11,231 his Attorney with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to sign his name to the drawings, to receive the Letters Patent, and to transact all business in the United States Patent Office connected therewith.

Signed at State of N.Y., in the County of New York and State of this 1st day of [illegible], 19[illegible]

(SIGN here FIRST name in FULL.) [signature]

(1) In case of assignment of the invention, application and oath must be made by actual inventor, even if patent issue to assignee.
(2) If the power of attorney be given to a firm, the full name of each member of firm must be given, or it will be ignored.

SPECIFICATION

To All Whom It May Concern:

BE IT KNOWN, That Elie F. Aghnides

citizen of the Greek Republic residing at New York City in the County of New York and State of New York has invented certain new and useful improvements in Fluid Mixing Devices

328120

of which the following is a specification:

APR - 1 AU 146. 01 BR

My invention relates to a device for intimately mixing a large volume of a gas, such as air, with a liquid such as water, and ordinarily is used for producing a jet of water containing air bubbles disseminated throughout the jet. Such a jet is whitish in appearance, soft and light to the touch and posesses numerous advantages not found in the ordinary water jet as discharged from a faucet. ~~For instance, when a full glass of water~~ is drawn from my device, myriads of bubbles escape leaving only half of the glass full, thus proving the large amount of air that was intimately mixed with the water. If one's hand is put in the path of the bubbly jet, the jet will flow evenly and uniformly over the surface and will wet the entire surface without splashing. Moreover, to the touch, the jet is caressingly soft and light, due to the presence of the bubbles which lessen the density of the jet.

If such an aerated jet is permitted to flow into a soap solution, it will make an extraordinarily large amount of foam, which will be found to be very useful generally for washing. When used for shampoo sprays and bath showers, the jet has a relaxing effect, in the same way as carbonated bubble baths. The action of the bubbly jet upon a soap solution should not be confused with the property of a jet flowing at high velocity - whether aerated or not by an injector-, which can force a certain amount of air into the solution and produce a certain amount of lather. Such lather is formed by large bubbles which dissipate rapidly and in addition, the jet splashes the water. On the other hand, the jet from my device is splashless and the lather formed is uniform, creamy, abundant and lasting.

After the air bubbles escape from a jet of water drawn through my device it has been demonstrated by chemical analysis that there is an increase in the dissolved oxygen content of the

water which reduces some of the objectionable taste and smell of the water.

It has been proposed heretofore to entrain a gas by the flow of a liquid under pressure and to mix the two fluids by means of obstructions in the path of the liquid. It has also been proposed to place a fine foraminous screen in the path of an unbroken forceful stream of liquid, for atomizing said liquid as it passes through the screen into the atmosphere but without any mixing of liquid and air being effected in the device.

In my device however, I finely break up the liquid and mix it with air before discharge and imprison in the mass of the liquid, small air particles, forming a coherent jet on discharge, with the air particles disseminated throughout the jet. I have discovered that with a certain degree of division of the fluid mixture, the air particles will remain in the flowing jet. I have also discovered that if the air has not been sufficiently divided and imprisoned in the mass of the liquid, it separates immediately at the discharge end of the device with no substantial amount in the flowing jet. On the other hand, if the air particles are too tiny, they will remain in the water after the flow, to disappear gradually, exactly the same way as when the water is cloudy due to trapped air. I have discovered that when the division is pushed too far, aeration is not so thorough, less air being mixed with the water and the advantages of my bubbly jet are lost. Accordingly, my device is designed to produce a jet with bubbles sufficiently small to remain in the jet, after discharge from the device but still large enough for breaking and escaping during the flow of the jet. This result cannot be obtained unless a minimum degree of division of the water is effec -

ted, either by an upstream foraminous diaphragm and a downstream screen together with the proper stream velocity, or similarly a downstream screen, an inlet orifice and an apertured diaphragm between.

Generally speaking, my invention consists of a device comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube, such as an ordinary household water faucet, containing water under the normal main pressure of about 3 atmospheres. The outlet end of the device is adapted to discharge a coherent jet containing air bubbles disseminated throughout the jet. At the upstream end of the chamber is an apertured diaphragm through which the stream of water is adapted to be forced into the chamber with substantial velocity. An air port opening into the chamber is provided through which air is induced by the stream of water. At least one foraminous screen is provided in the path of the stream of water after it leaves the apertured diaphragm and before it discharges at the outlet end, for finely breaking up the stream of water which is throughly mixed with the air.

Means are provided for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet. This may be in part, a multiplicity of orifices in the upstream diaphragm ~~so as to deliver sufficient water to flood the screen;~~ or in the addition of at least a second foraminous screen between the first screen and the outlet end, with openings so close to each other that the issuing aerated water unites to form a coherent jet; or, in the addition of a tubular portion at the outlet end and adapted to contract the stream of aerated water issuing from the screen, to form a coherent jet.

Referring to the drawing ~~for a more complete disclosure of the invention.~~

Fig. 1 is a vertical section of one form of my invention. ~~attached to a water faucet.~~

Figs. 2 and 3 are similar sections of modified forms.

As shown in Fig. 1, my device is attached to an ordinary water faucet 1 and comprises a rubber tap connector portion 2, that grips tightly over the end of the faucet, water under pressure passing through the apertures 3 into the chamber 4 for forcing the connector into gripping position, all as more fully described in my U. S. patent No. 2071,780. In the upstream end is a metal diaphragm 5 that is provided with a plurality of orifices 6 uniformly distributed throughout the area of the diaphragm. At the downstream end is a perforated plate screen 7 and below it is the contracted outlet 8 to unite the stream, it also renders ~~to render~~ the contour of the jet cylindrical and the flow uniform. For inducing air into the chamber 9 between the diaphragm 6 and the screen 7 are a plurality of air inlet openings 10.

In Fig. 2, my device is secured to the end of the faucet by a screw coupling 11 and the apertured diaphragm 5 is clamped between the end of the faucet 12 and the lower portion 13. Instead however of having only one downstream screen as in Fig. 1, I provide two spaced screens 14 and 15 for dividing and mixing the air and water and which will cause the air bubbles in the water to be somewhat smaller than where only a single screen is employed. Air inlets 16 suitable in number are provided in the walls of the portion 13.

In Fig. 3, I employ the same type of rubber tap connector 2 as in Fig. 1, except that I provide a constricted orifice 17, above the upstream apertured diaphragm 18, and the air inlets 19 terminate close to the surface of the downstream screen 20.

In Fig. 4, I employ a screw coupling 21 having a restricted orifice 22 for connecting my device to a faucet and I employ two spaced apertured diaphragms 23, 24 located above the air inlets 25 and I use three spaced screens 26, 27, 28, in the downstream end of the device.

Plaintiff's Exhibit 17

In Fig. 5, I use a single upstream apertured diaphragm 29 and three contacting superposed screens 39 in the downstream end of my device. The device is screw connected to the end of a faucet and the diaphragm 29 is clamped therein. Air apertures 40 are provided in the wall of the device.

In Fig. 3, I employ the same general type of rubber tap connector 30 as in Fig. 1 ~~and 3~~. The metal coupling 31 having a restricted orifice 32 is secured thereto. Screwed to the coupling is the lower portion 33, provided with air inlets 34, an upstream diaphragm 35 having a single orifice 36 and five spaced wire screens 37, 37a, 37b, 37c, and 37d. The purpose of the multiplicity of screens is to compensate for the decrease in the division of the water through the single orifice 36 as compared with a multiplicity of orifices, as in the other embodiments. When a single orifice is used in the upstream diaphragm, the ~~the~~ number of screens used depends on the ~~size of the~~ orifice area, the distance between the diaphragm and screens and the mesh of the wire screens.

The essential features of my invention, as embodied in the various modified forms shown in the drawing comprise an upstream apertured diaphragm adapted to deliver a stream of water with substantial velocity and a down stream screen in the path of the stream of water, which finely breaks up the stream and mixes it with air before discharge. The screen offers only a small resistance to the flow of the stream therethrough i.e. the required minimum resistance necessary for the proper functioning of the device. If only one screen ~~having the minimum resistance~~ is used instead of a plurality of such screens, then the number of holes in the diaphragm or the distance between the diaphragm and the screen must be increased. ~~By so doing, the stream will impinge on the screen with less force and flood it. In order to accomplish the desired end, there must be a sufficient volume of water~~

~~at such a velocity issuing from the upstream diaphragm to spread over and flood the downstream screen.~~

The preferred embodiment of my invention for accomplishing this end comprises a device in which there are a multiplicity of orifices spread over the upstream diaphragm and a plurality of superposed wire mesh screens downstream, said screens preferably separated from each other by an interspace. Unless there is a certain degree of division of the water, the desired results cannot be obtained. In the preferred embodiment, the optimum divisionis obtained for rendering the jet as light as possible to the touch, which means a large proportion of air imprisoned in the mass of the jet in the form of air bubbles.

A non-limitative example is a device in which the upstream diaphragm, 0.8-1 mm. thick and 22mm in diameter, has thirty-two uniformly spaced holes, 0.8mm in diameter each, and 6mm downstream from said diaphragm are three superposed wire mesh screens 20mm in diameter, with an interspace between the screens of 1mm. The screens have 15 wires per linear centimeter, each wire being 0.23mm in diameter. Air ports open into the chamber between the diaphragm and the downstream screens. ~~The aerated water issuing from the last wire mesh screen unites to form a coherent jet, the~~ The outlet end is contracted to 17mm diameter. Such a construction provides the optimum screen resistance, good contact between the air and water in the chamber and the pressure of the water is more evenly distributed across the outlet end, which means a softer and more uniform flow of the bubbly jet.

The best results are obtained by the use of finely foraminous discharge screens in which the holes are very close together and the plane parts between the holes are very reduced. ~~In other words, the resistance offered by such foraminous screens must on the one hand be sufficient to break the velocity of the stream of~~

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~~ter, flood the screen and cause the fluids to divide and mix.~~ On the other hand, the resistance offered by said screen or screens must be as low as possible because with the increase of resistance the amount of the air passing through the device decreases.

In the above example, if more than three screens of the type described were used, the jet would contain bubbles of smaller size, the total amount of air contained in the jet would become much less and the color of the jet would be less whitish. On the contrary, if a screen was removed or if three screens having less than 15 meshes per linear centimeter were used, the bubbles contained in the jet would become larger. As the distance from the outlet increases, the number of bubbles contained in the cross sectional area of the stream decreases.

I have found that when the water is discharged through a restricted orifice, as at 17, Fig. 1, at 22 Fig. 3, and at 32 Fig. 5 that the flow through the orifices in the upstream diaphragm is improved and a more regular and softer jet is delivered from the outlet end of the device.

A similar result is obtained when instead of the restricted orifice upstream of the diaphragm, a second foraminous diaphragm as 23, Fig. 4, preferably with greater aggregate cross section of the foramina, is located upstream of the first diaphragm 24, at a distance of about 1mm. Both the restricted orifice and the second diaphragm can be used together for a more uniform flow of the bubbly jet.

When the water is turned on through my device, if the faucet is opened only slightly so that very little kinetic energy is developed in the water as it emerges from the apertured upstream diaphragm, the water will discharge from the downstream screen in a perfectly normal manner and without air bubbles. However, as the faucet is opened further and the velocity increases, the water emerging from the orifices in the upstream diaphragm will draw air in through the air-ports, and this water striking the discharge screens will be finely broken up, and mixed with air ~~and flood the~~

screen. When the water attains a certain velocity, the entrained air acquires the necessary speed to pass through the resistance offered by the screen and the water. The air is likewise divided by the screen and the two fluids thus broken up thoroughly mix and the air particles are imprisoned in the mass of liquid. With a water pressure of about one atmosphere, a fairly well aerated jet will be discharged in the above example. Very good results are obtained when the pressure attains or exceeds 2 atmospheres up to the main pressure. Having secured the aerated mixture, it is withdrawn from the chamber in the form of a coherent jet with small bubbles disseminated throughout the jet. This arises in part from the fact that the openings in the downstream screen are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet. The coherence of the jet arises from the fact that the zone of aspiration of each little stream cuts or is at least tangent with the suction zone of the adjacent stream.

This application is a continuation in part of my applications Ser. No. 182,884 filed Dec. 31, 1937, and Ser. No. 52,923 filed Dec. 4, 1935.

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4 Claims:

1. A device for producing a coherent jet of water containing fine air bubbles disseminated throughout the jet comprising an aerating and mixing chamber, the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber provided with a multiplicity of apertures to divide the water into streamlets having a substantial velocity, an air port opening into the chamber through which air is induced by the streams of water, a screen at the discharge end of the device to subdivide the stream, the size of the apertures in the screen relative to the velocity and volume of the stream offering sufficient resistance at a predetermined velocity of the stream to flood the screen and effect the mixing of the water with the air, the aerated water uniting before discharge at the outlet end to form a coherent jet having small bubbles disseminated throughout the jet, the bubbles being of a size that will be retained in the flowing jet on discharge but will escape after discharge and during the flow of the jet.

2. A device for producing a coherent jet of water containing fine air bubbles disseminated throughout the jet and comprising an aerating and mixing chamber, the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge the said coherent jet, a screen at the discharge end of the device for subdividing the water, an apertured diaphragm between the inlet end of the device and the outlet screen that will effect division of the water and spread the stream over the face of the outlet screen to flood it, an air port opening into the chamber through which the air is induced by the stream of water, the size of the apertures in the screen offering

sufficient resistance at a predetermined velocity of the stream to flood the screen and effect mixing of the water and air, the aerated water uniting before discharge at the outlet end to form a coherent jet having small bubbles disseminated throughout the jet, the bubbles being of a size that will be retained in the flowing jet on discharge but will escape after discharge and during the flow of the jet.

3. The device of claim 1 in which there is a foraminous member upstream the diaphragm.

4. The device of claim 1 in which there is a restricted orifice upstream the diaphragm.

5. The device of claim 1 in which there is a restricted orifice and foraminous member upstream the diaphragm.

6. The device of claim 1 in which there is a tubular channel between the outlet screen and the outlet end adapted to contract the stream before its discharge.

7. The device of claim 1 in which there is a plurality of superposed screens at the discharge end of the device.

8. The device of claim 1 in which there is a plurality of superposed upstream diaphragms.

9. A device for producing a coherent jet of water containing fine air bubbles disseminated throughout the jet comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge said coherent jet, an apertured diaphragm at the upstream end of the chamber through which the stream of water is adpted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, andmeans in the path of the stream of water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet, the bubbles being of a size that will be retained in the flowing jet on dis-

charge but will escape after discharge and during the flow of the jet.

10. A device for producing a coherent jet of water containing air bubbles disseminated throughout the jet, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, an apertured diaphragm at the upstream end of the chamber through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means in the path of the stream of water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and for offering sufficient resistance for throughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet, the resistance offered by the said means and the apertured area of the diaphragm being proportioned to effect a division and mixing of the air with the water before their discharge from said outlet end, the bubbles being of a size that will be retained in the flowing jet on discharge but will escape after discharge and during the flow of the jet.

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In Witness whereof I affix my signature to the specification.

(2) Elie Aghnides

Elie G. Aghnides

State of New York :
: ss
County of New York:

Elie G. Aghnides being duly sworn, deposes and says that he is a citizen of the Greek Republic and a resident of New York City, N. Y.; that he verily believes himself to be the original, first and sole inventor of the Fluid Mixing Device described and claimed in the annexed specification which discloses and claims certain matters derived from earlier applications filed by him on December 4, 1935 Serial Number 52,923 and on December 31, 1937 Serial Number 182,884; that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or patented or described in any printed publication in the United States of America or any foreign country before his invention or discovery thereof; that he does not know and does not believe that the same, except as to matters disclosed in said applications Ser. No. 52,923 and Ser. No. 182,884 was patented or described in any printed publication in the United States of America, or any foreign country more than two years prior to this application, or in public use or on sale in the United States for more than two years prior to this application; or patented in any country foreign to the United States on an application filed by him or his legal representatives or assigns more than twelve months prior to this application and that no application for patent on said invention has been filed by him or his legal representatives or assigns in any country foreign to the United States, except as follows:

12 32[illegible]

Belgium Dec. 8, 1934 and in a number of other foreign countries the exact list of which is not now available to affiant, all of which applications were filed within one year subsequent to the date of the filing of the said Belgian application, but the information regarding specific dates thereof is not now available toaffiant.

Elie P. Aghnides

Sworn to and subscribed before me this 5th April 1940.

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Plaintiff's Exhibit 17

328120

Fig. 1.

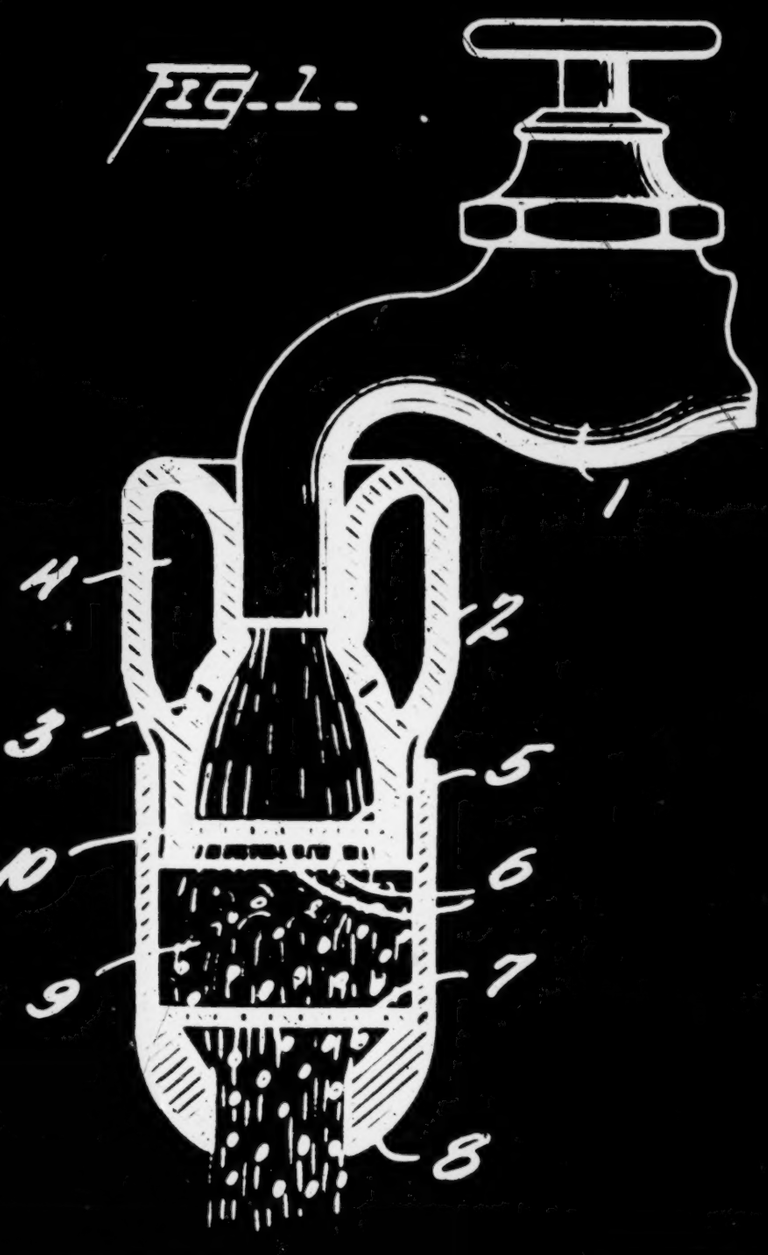


Fig. 2.

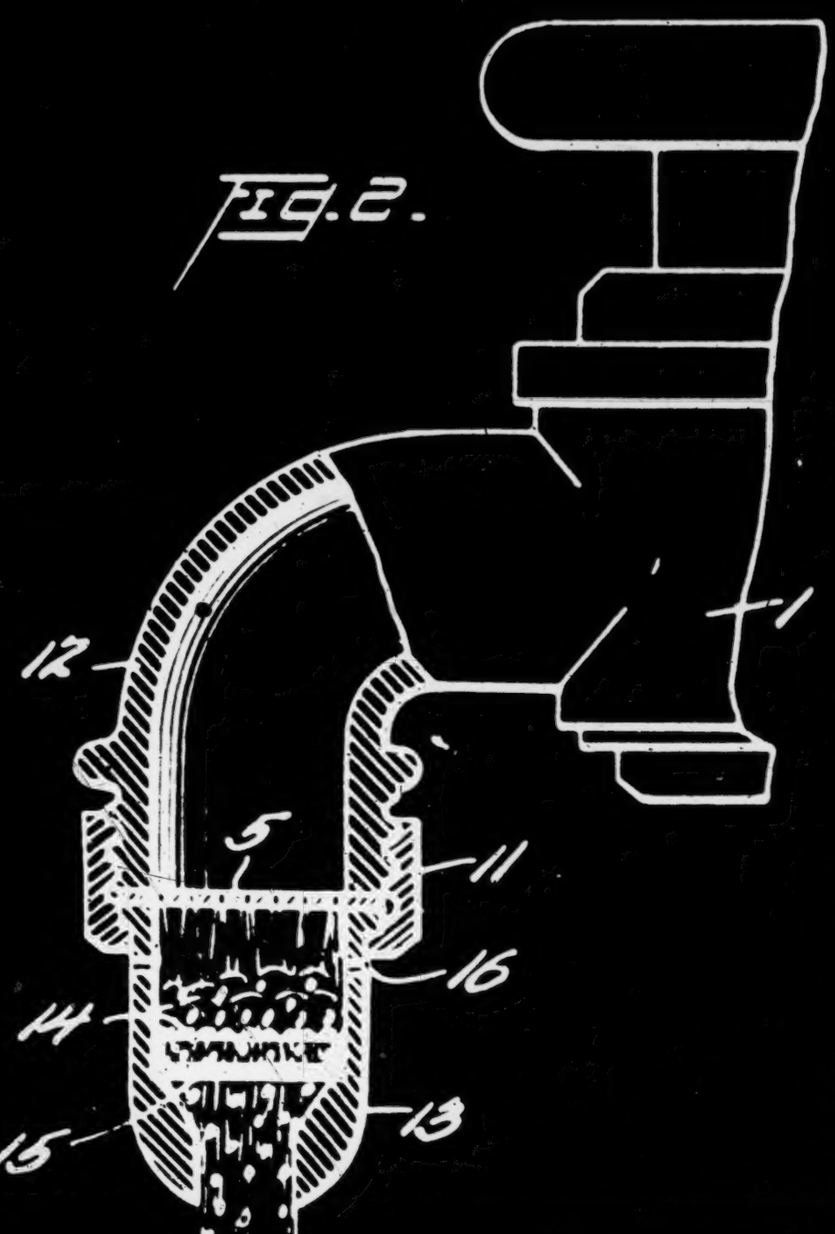


Fig. 3.

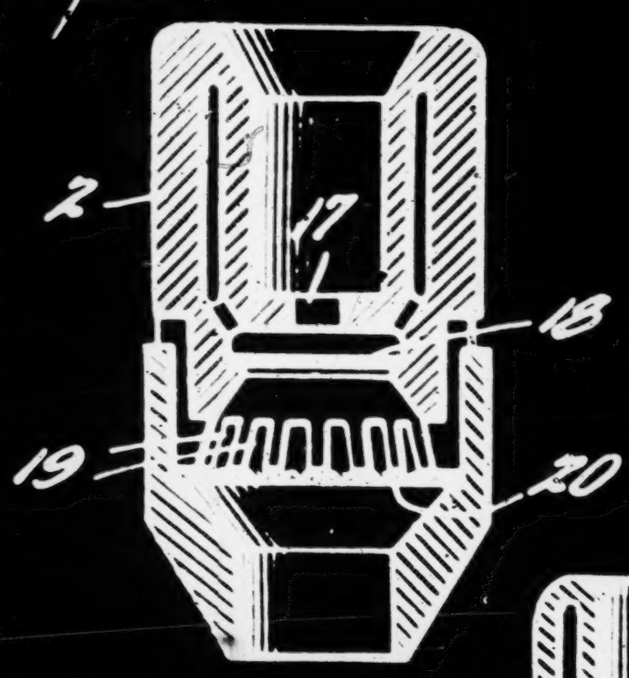


Fig. 4.

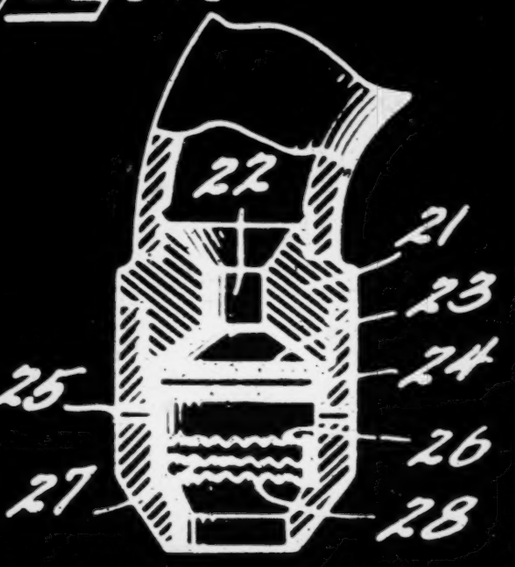


Fig. 5.

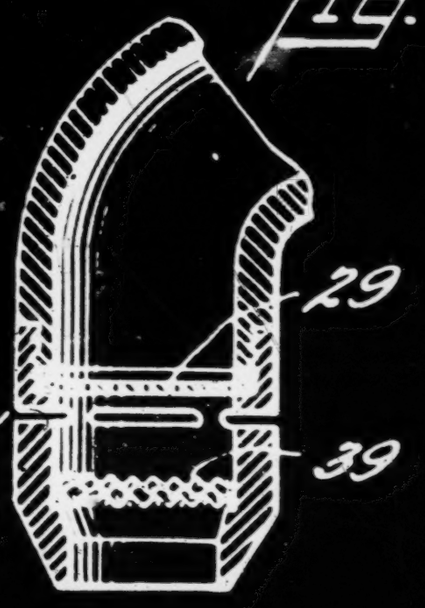
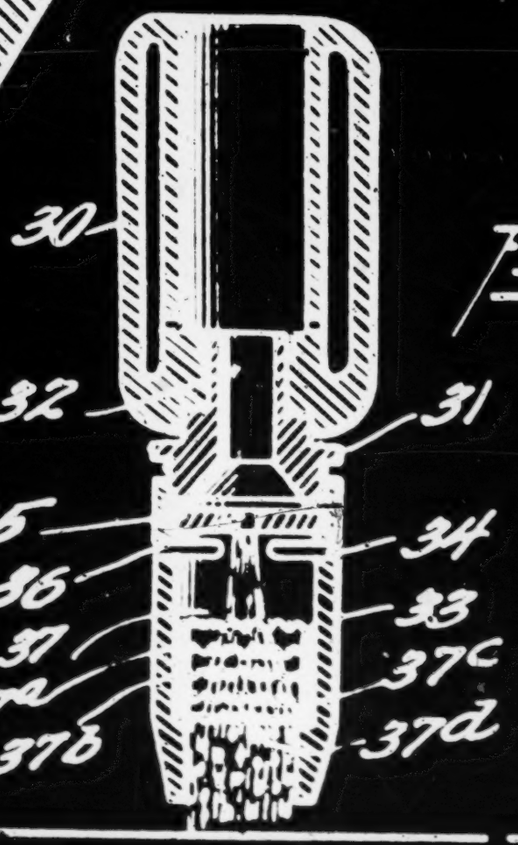


Fig. 6.



Inventor

Elie P. Aghnides

By

John Boyle Jr.

Attorney

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328120

Plaintiff's Exhibit 17 2 App. 163

Div. 32 Room 4086 980

Paper No. 3

All communications respecting this application should give the serial number, date of filing, and name of the applicant

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

PRN:mk

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

... 11—8623

Applicant: Elie P. Aghnides

Ser. No. 328,120
Filed April 5, 1940
For FLUID MIXING DEVICES

John Boyle, Jr.
801 Washington Loan & Trust Bldg.
Washington, D. C.

MAILED MAY 15 1940

This application has been examined.

References relied upon:

Guild	25,566	Sept. 27, 1859	261-116
Friedrich	2,003,184	May 28, 1935	261-116
Felten et al (Br.)	6,012	of 1909	261-76
Haisman et al (Br.)	7,005	Mar. 22, 1913	299-141

(1 sheet drawing, 3 pages specification)

The name of the inventor is not uniform in the papers. The middle initial is "P" in some places and "F." in others.

Claims 1 to 10 are rejected on Haisman et al or Friedrich. In the former the diaphram 2 is provided with a plurality of apertures 3 discharging jets of water against a screen 6, an air port 10 permitting air to enter and mix with the water. While the patent contemplates forming a spray, the claims under consideration do not describe structure matterially different but rely upon statements of result to distinguish. In order to point out the difference, the limitations must involve structural differences, not the result. Friedrich shows in Fig. 2 equivalent means including a plurality of apertures 37 for forming a spray to entrain gas to form a fluid mixture in nature similar to that described by the claims. Baffles 161, Fig. 20, assist in forming this mixture. The various screens, etc. included by claims 7 and 8 are obvious means for intermixing the fluids or separating the liquid into a plurality of streams. The screen above the diaphram is present in Haisman et al. The plurality of outlet screens is shown by Felten et al.

Claims 1 to 10 are further rejected on the ground of

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double prosecution of similar claims in different applications. The copending application 182,884 includes claims indistinguishable in scope from the claims under consideration. See ex parte Smith 1888 C. D. 131.

Claims 1 to 10 are rejected.

JAH.

Paul R. Neff
Acting Examiner.

16.

328120

IN THE UNITED STATES PATENT OFFICE

Applicant: Elie Aghnides
Serial No. 328,120
Filed April 5, 1940
For Fluid Mixing Devices.

U.S PATENT OFFICE
NOV 15 1940
DIVISION XXII.

Div. 32
Room 4086.

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

In response to the Office Action dated May 15, 1940:
Page 2, cancel all but the first two lines and substitute:

--In my patent 2,210,486 dated Aug. 6, 1940, I have disclosed several types of devices of the type just described and in which one or more superposed fine wire mesh screens having holes of about 0.6 sq. mm. are placed in the path of one or more streams flowing from the upstream diaphragm with substantial kinetic energy. Good results have been obtained using devices of the type described. Upon further experimentation, I have discovered certain improvements that make operation of the jet even more satisfactory. These improvements are based upon discovery of the fact that the degree of division of the fluid mixture determines to a certain extent, the length of time that the air will remain imprisoned in the liquid. I have discovered that with a certain degree of division of the fluid mixture, the air particles will remain in the flowing jet. On the other hand, if the air has not been sufficiently divided and imprisoned in the mass of liquid, it separates immediately at the discharge end of the device with no substantial amount in the flowing jet. I have also discovered that if the air particles are too tiny, they will remain in the water after the flow, to disappear gradually, the same way as when water is cloudy due to trapped air. I have discovered that when the division is pushed too far, aeration is not so thorough, less air being mixed with the water, and the air particles are too small to produce an appreciable effect of

effervescence during the flow or use of the jet. By specially proportioning the orifice area in the upstream diaphragm and the downstream dividing-mixing resistance, I have been able to produce a jet containing air particles of the described character. In such a device, the mixing is very intimate but the quantity of air contacted with the water is relatively small. While a device discharging a jet containing tiny air particles is useful for drawing beer to form a persistent froth on the top of the beer, when aeration of water is considered, the device must be proportioned to produce a jet having bubbles, rather than tiny air particles, the latter being devoid of buoyancy and forming an emulsion-like mixture instead of the desired bubbly jet with the spectacular effect upon a soap solution.

Accordingly, my device is designed to produce a jet with bubbles sufficiently small to remain in the jet, after discharge from the device but still large enough for breaking and escaping precipitately from the water collected at the discharge, as in a receptacle or otherwise after the disruption of the jet through impact on a surface. In the improvements about to be described, my device is so designed as to form a jet having in its mass, a large amount of air in the state of bubbles of such size, as to function in the manner just described. --

Page 3, cancel lines 1-4; line 5, after "consists" insert--therefore--; line 23, cancel beginning "so" through "screen" in line 24; line 30, cancel beginning "for" to the end of the sentence.

Page 4, line 11, cancel "to render" and substitute --to unite the stream. It also renders--.

Page 5, line 11, cancel beginning "The" through "diaphragm", line 14 and capitalize "the", line 15; line 16, cancel "size of the" and after "orifice" insert --area--; line 27, cancel "having the minimum resistance--; line 30, cancel the sentence beginning "By" through the

first two lines on page 6 and substitute -- By so doing the streamlets will impinge on the screen with less force which will correspond to an increase of the resistance of the screen and thus the latter will oppose to the streamlets the required minimum resistance.--

Page 6, line 20, cancel the sentence beginning "The" through "jet" line 21 and capitalize "the"; line 22, cancel "being" and substitute --is--; line 22 before the period insert -- to render the contour of the jet uniform--; line 23, after "resistance" insert --which means the right proportion between the holes in the diaphragm and the downstream dividing and mixing means; line 29, cancel beginning "In" to the end of the page and through "hand", page 7, line 2.

Page 7, line 2, before "the" insert -- In other words--; line 11, before "larger" insert -- and the pressure, throughout the cross-section of the bubbly jet, unevenly distributed.--; last line, before "mixed" insert --and--; cancel the last three words and the wond "screen" page 8, line 1.

Page 8, line 5, cancel the sentence beginning "with" through the period in line 7, and substitute -- In the above example the device is so proportioned that with a water pressure of about one atmosphere a fairly well aerated jet will be discharged.--; line 19, insert after "1937"-patented August 6, 1940, number 2,210,846.

Page 7, line 16, change "Fig. 5" to --Fig. 6--.

Please cancel the middle initial of applicant wherever it appears in the application.

Cancel all the claims and substitute the following:

11. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a fuacet or the like and the outlet end of which is adapted to discharge said jet, means at the

upstream end of the chamber to divide the water into streamlets having a substantial velocity, an air port opening into the chamber through which air is induced by the streamlets of water, and downstream means in the path of the water after it leaves the means at the upstream end of the chamber and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles, the bubbles being of a size that will be retained in the flowing jet on discharge but will escape precipitately from the water after disruption of the jet.

12. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge said jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water and at least one foraminous screen in the path of the stream of water and after it leaves the orifice and before it discharges at the outlet end for finely breaking up the water and mixing it with the air to form a coherent jet having bubbles, the bubbles being of a size that will be retained in the flowing jet on discharge but will escape precipitately from the sater after the disruption of the flowing jet.

13. A device for producing a jet of water containing air bubbles comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which the stream of water is adapted to be forced into the chamber with substantial

velocity, an air port opening into the chamber through which the air is induced by the stream of water, means in the path of the stream of water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air and for thereafter uniting the aerated water to form a coherent jet having bubbles of a size that will be retained in the flowing jet on discharge but will escape precipitately from the water after disruption of the flowing jet.

14. A device for producing a jet of water containing air bubbles comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to dischage the jet, an apertured diaphragm at the upstream end of the chamber through which the stream of water is adapted to be forced ihto the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means in the path of the stream of water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water to form a coherent jet having bubbles, the resistance offered by the said means and the apertured area of the diaphragm being proportioned to effect the entrainment and mixing of the air with the water before their discharge from said outlet end, the bubbles being of a size that will be retained in the flowing jet on discharge but will escape precipitately from the water after disruption of the flowing jet.

C 670

15. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a foraminous member upstream the apertured diaphragm.

16. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice upstream the apertured diaphragm.

17. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured

diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice and foraminous member upstream the apertured diaphragm.

18. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, superposed apertured diaphragms at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragms and means in the path of the stream of water after it leaves the apertured diaphragms and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles.

Remarks.

The rejected claims have all been cancelled and rewritten in view of applicant's prior patent 2,210,846. The claims of this patent were allowed by the Board of Appeals over the same references as are relied upon here. For that reason it is believed that no further discussion of these references and the construction put upon them is believed necessary. The sole question now presented

is one of distinguishing over applicant's prior patent. The revision of page 2 of the specification points out the improvement that has been made and claims 11-14 are directed to this improvement. The remaining claims are directed to certain structural features and which are not disclosed in the prior patent. Since the new claims are distinguishable in scope from the prior patent the rejection on the ground of double patenting is not tenable. The decision relied upon by the Examiner was overruled in Feister 1890 C. D. 167 and Cahill 1893 C. D. 78. Reconsideration and allowance is requested.

Respectfully submitted,

By John Boyd
Attorney.

November 14, 1940.

2 App. 172 Plaintiff's Exhibit 17

Div. 32 Room 4086

Address only
"The Commissioner of Patents,
Washington, D. C.,"
and not any official by name.

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Paper No. 5

All communications respecting this application should give the serial number, date of filing, and name of the applicant

PRN:TIS

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

11—8028

John Boyle, Jr.
801 Washington Loan & Trust Bldg.
Washington, D. C.

Applicant: Elie Aghnides

Ser. No. 328,120
Filed Apr. 5, 1940
For FLUID MIXING DEVICES

NOV 27 1940

Responsive to amendment filed Nov. 14, 1940.

Added art:

Aghnides	2,210,846	Aug. 6, 1940	261/76

Claims 11 to 18 are rejected on the ground of double patenting in view of the patent to Aghnides who shows and claims the same structure having the same mode of operation as the device of the claims. In page 2 applicant has attempted to distinguish between the results provided by the patented device and those produced by the matter of this application. While there may be a difference in degree of fineness of the air bubbles in the water such difference cannot distinguish the present claims wherein the structure set forth is the same. In order to support a second patent structure patentably distinct from that shown and claimed must be set forth.

Claims 1 to 10 are canceled.

Claims 11 to 18 are rejected.

Examiner.

25

U.S. PATENT OFFICE
MAY 27 1941
DIVISION XXXII

U.S. PATENT APPLICATION DIV.
MAY 26 '41

TO THE UNITED STATES PATENT OFFICE

Applicant: Elie Aghnides
Ser. No. 328,120
Filed April 5, 1940
For Fluid Mixing Devices

Div. 32
Room 4086

Honorable Commissioner of Patents:

Sir:

In response to the Office Action dated November 27,1941, please amend as follows:

Cancel claims 11, 12, 13 and 14 and substitute the following:

~~14~~. A device for producing a jet of water containing air bubbles comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the jet, an orifice at the upstream end of the chamber through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the streams of water, and means in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up and for mixing the fluids to form a coherent jet having bubbles, the resistance offered by the said means and the cross-sectional area of the orifice being proportioned to produce bubbles of a size that will be retained in the flowing jet on discharge but will escape precipitately from the water after disruption of the flowing jet.

REMARKS

Reconsideration of the rejection on the ground of double patenting is requested. The Examiner says that the Aghnides patent shows and claims the same structure having the same mode of operation as the device of the claims but this is not so. The patent discloses a device for producing a bubbly jet but does not show a device for producing the particular bubbly jet that is claimed. while he described in his patent 2210,486 how a bubbly jet can be obtained by placing in the path of one or more streams flowing from the upstream diaphragm with substantial kinetic energy, one or more superposed fine wire mesh screens having holes of about 0.6 sq. mm., he did not disclose at that time that when resistance by the screen attains a certain degree, bubbles having different characteristics can be obtained, these bubbles also being small enough to be retained in the jet.

We commend to the Examiner a careful reading of the amendatory matter on pages 1 and 2 of the last amendment. Having made the discovery that he did, that the length of time that the air bubble remained in the jet depended on the degree of division of the fluid mixture, he secured the desired division to produce the desired jet by proportioning the resistance offered by the screen to the apertured area of the diaphragm. This was not taught in the first patent and therefore claim 14 defines a specific type of bubbles which is, of course, comprised in the complete range of bubbles small enough to be retained in the jet, as covered by his patent.

The Examiner takes the position that while there is a difference in degree of fineness of the air bubbles that the claims set forth the same structure as disclosed in the patent. But mere contour of parts does not define structure. Proportions of parts to produce a different result is just as much structure as contour. In Eibel Co. v. Paper Co. 261 U. S. all that the patentee did was to change the angle of the paper making wire so that the paper went through the machine at a higher speed and thus produced a more uniform sheet of paper. That change produced a different structure of machine because it produced a different result. Yet if the Examiner is right here then the Supreme Court is wrong. In Hobbs v. Beach 180 U. S. 383, the Court said "the invention consisting rather in the idea that such change could be made, than in making the necessary alterations".

As to claim 15, which specifies "a foraminous member upstream the apertured diaphragm"; claim 16 which specifies " a restricted orifice upstream the apertured diaphragm"; claim 17 which specifies " a restricted orifice and foraminous member upstream"; and claim 18 which specifies "superposed diaphragms at the upstream end", these species are neither shown, described or claimed in applicants prior patent. The purpose of these constructions is explained in the specification at page 7.

Respectfully submitted,

Elie Aghnides,

By John Boyle
His Attorney

May 23, 1941.

28 3[illegible]120

Plaintiff's Exhibit 17

Div. 32 ROOM 4086 200

Address only "The Commissioner of Patents, Washington, D. C.," and not any official by name

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Paper No. 7

All communications respecting this application should give the serial number, date of filing, and name of the applicant

PRN:TIS

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

SPO 11—8623

John Boyle, Jr.
801 Wash. Loan & Trust Bldg.
Washington, D. C.

Applicant: Elie Aghnides

Ser. No. 328,120
Filed Apr. 5, 1940
For FLUID MIXING DEVICES

MAILED
JUL 26 1941

Responsive to amendment filed May 26, 1941.

Claims 15 to 19 are rejected on the ground of double patenting in view of the Aghnides patent. The language of claims 15 to 18 points out no material difference over the structure shown and claimed by the patent. The orifice 17 of Fig. 3 in this application is anticipated by analogous elements in Figs. 2, 4 and 5 of the patent. Broadly construed the restricted orifice is indistinguishable from the passage through the faucet which is inherently restricted. Claim 19 attempts to distinguish by language relating to the product. It is not apparent that this requires any change in form or proportions but if so such changes do not constitute patentable subject matter. It is well known that the rate of movement through liquid depends upon the size of bubble and the patent covers apparatus for forming the same product however expressed.

Claims 1 to 14 are canceled.

Claims 15 to 19 are finally rejected.

THIS IS A FINAL REJECTION AND CLOSES THE PROSECUTION OF THE CASE BEFORE THE PRIMARY EXAMINER. ANY AMENDMENT OR REQUEST FOR RECONSIDERATION WHICH ON INSPECTION IS FOUND TO REQUIRE REEXAMINATION OF THE CASE WILL NOT BE ENTERED, BUT, IF PROMPTLY FILED, MAY BE GIVEN CONSIDERATION A REASONABLE TIME PRIOR TO THE EXPIRATION OF THE STATUTORY PERIOD. (SEE EX PARTE PETERSON 1928 C. D. 31.)

29 Jul 328120

Examiner.

2 App. 177

Plaintiff's Exhibit 17

41833

MAIL DIVISION
JAN - 6 1942
U.S. PATENT OFFICE

U. S. PATENT OFFICE
JAN 12 1942
DIVISION XXXII.

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IN THE UNITED STATES PATENT OFFICE

APPEAL TO BOARD OF APPEALS

Applicant: Elie Aghnides
Ser. No. 328,120
Filed April 5, 1940
For Fluid Mixing Devices

Div. 32
Room 4086

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

I hereby appeal to the Board of Appeals from the decision of the Principal Examiner in the matter of the above entitled application which was finally rejected July 26, 1941:

The following are the points of the decision on which appeal is taken:

The Examiner erred in finally rejecting claims 15 to 19 on the reference and for the reasons of record.

Check for $15 covering the appeal fee is enclosed herewith.

An oral hearing is requested.

Respectfully submitted,

Elie Aghnides,

By John Boyd
His Attorney

January 5, 1942

BOARD OF APPEALS
JAN 7 1942
U. S. PATENT OFFICE

328120

2 App. 178 Plaintiff's Exhibit 17

Div. 32 Room 4086 PRN:TIS Paper No. 9

UNITED STATES PATENT OFFICE

WASHINGTON, D. C.

JAN 30 1942

In re application of Elie Aghnides Ser. No. 328,120 Filed Apr. 5, 1940 For: FLUID MIXING DEVICES	BEFORE THE BOARD OF APPEALS

EXAMINER'S STATEMENT

This is an appeal from the final rejection of claims 15 to 19 on the ground of double patenting in view of the copending patent: /Aghnides, 2,210,846, Aug. 6, 1940/

The rejected claims are:

15. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a foraminous member upstream the apertured diaphragm.

16. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice upstream the apertured diaphragm.

17. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, and apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber

through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice and foraminous member upstream the apertured diaphragm.

18. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, superposed apertured diaphragms at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragms and means in the path of the stream of water after it leaves the apertured diaphragms and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles.

19. A device for producing a jet of water containing air bubbles comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the jet, an orifice at the upstream end of the chamber through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the streams of water, and means in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up and for mixing the fluids to form a coherent jet having bubbles, the resistance offered by the said means and the cross-sectional area of the orifice being proportioned to produce bubbles of a size that will be retained in the flowing jet on discharge but will escape precipitately from the water after disruption of the flowing jet.

The alleged invention relates to an attachment to ordinary water faucets for mixing finely divided air bubbles through the water whereby the jet produced is soft and does not splash. As illustrated by the drawing six species are shown of which those comprising Figs. 1 and 2 are apparently identical with Figs. 1 and 4 respectfully in applicant's patent. These species have in common means to attach the device to one or the other of two types of faucets. As shown by Fig. 1 of this application the water is first forced through a perforated plate 5 into a chamber 9 having air inlets 10 and the mixture formed

is forced through perforated plate 7. Fig. 2 shows substantially the same device except for the provision of a plurality of screens 14, 15. Fig. 5 shows another specie similar to that of Fig. 2 in the patent having perforated plate 29 and screens 39 and no substantial departure from the device in Fig. 2. These three species are believed to have identical characteristics with those comprising bags 1, 2 and 4 of the patent but Fig. 1 is described as "one formof my invention" and Figs. 2 to 6 of modified forms. In other words applicant does not draw any line between species common to both cases and others which may appear to differ slightly therefrom.

In the species depicted by Figs. 3, 4 and 6 of this application similar perforated plates are followed by air mixing chambers and one or more screens. The water is however initially forced through a restricted orifice 17, 22 and 32 respectfully whereby applicant states that the flow is improved and a softer jet delivered.

Applicant states that when the faucet water is turned slightly on the water contains no bubbles but when the velocity through the perforated plates is increased the water will draw air through the air ports and this water striking the screens will be broken up mixed with the air. It is not pointed out that the initial jet as 17 in Fig. 3 for example has any specific effect on the water stream.

The patent to Aghnides has, as pointed out above, substantially the same disclosure and provides the same soft jet of water. Figs. 1, 2 and 4 include the same air and water mixing elements as Figs. 1, 5 and 2 respectively of this application. These elements are covered by the claims as for example claim 1 with the addition of claim 4.

33

Claim 15 recites a device, such as in Fig. 3, comprising a chamber 2 adapted for connection with the outlet of a faucet an apertured diaphram 18, an air port 19, opening into the chamber and means 20 in the path of the water for breaking up the water and mixing it with the air and a foraminous member (17) upstream the diaphram.

This claim does not patentably differ from claim 1 of the patent which in lines 56, 57 recites the chamber, in lines 61, 64 it recites the diaphram with an orifice, an air port is recited in lines 64, 65 and in lines 66 to 73 the screens are included. The claim adds a foraminous member 17 upstream the diaphram but applicant does not show wherein this element involves invention. The constriction within the faucet itself provides a similar aperture. Also as broadly recited the member is totally lacking in function as it could even be arranged edgewise in the stream.

Claims 16 and 17 aover substantially the same device as claim 15 and are considered to be unpatentable over the patent claims for like reasons. The restricted orifice upstream the diaphram in claim 16 is anticipated by the constriction in the faucet.

Claim 17, lines 4 to 6, groups the apertured 17 and 18 as "apertured diaphrams" which do not materially differentiate from the diaphram with orifice in the patent claim.

Claim 19 recites positively only the orifice in 18, airport 19 and screen 20. The last seven lines attempt to quantitatively limit the elements by stating the desired effect upon the water. This language appears to amount to no more than the last five lines of claim 1 in the patent. The size

of the bubbles has to be within certain limits to form the coherent jet. The claim therefore recites the same subject matter and not a separate invention.

The claims are considered to be properly rejected.

Respectfully,

S.R.H.

Examiner, Division 32.

Plaintiff's Exhibit 17 — 2 App. 183

ADDRESS ONLY
THE COMMISSIONER OF PATENTS
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201

Paper No. 10

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

April 6, 1942

Sir:

The case of Elie Aghnides
(Appeal No. 41,833)

Serial [redacted] No. 328,120, will be heard by the Board of Appeals on the 1st day of June, 19 42

The hearings will commence at 9.30 A. M. and as soon as the argument in one case is concluded the succeeding case will be taken up.

If any party, or his attorney, shall not appear when the case is called, his right to an oral hearing will be regarded as waived.

The time allowed for arguments is as follows:

Ex parte cases; thirty minutes;
Inter partes appeals: Interlocutory and final hearings when no testimony has been taken, thirty minutes each side; final hearing when testimony has been taken, one hour each side.

By special leave, obtained before the argument is commenced, the time may be extended.

The appellant shall have the right to open and conclude in inter partes cases, and in such cases a full and fair opening must be made.

Briefs in inter partes appeals must be filed in accordance with the provisions of Rules 144 and 163, as amended.

Respectfully,

Commissioner of Patents.

To

36

To Mr. John Boyle, Jr.,
801 Wash. Loan & Trust Bldg.,
Washington, D. C.

328120

BOARD OF APPEALS
MAY 27 1942
U.S. PATENT OFFICE

IN THE UNITED STATES PATENT OFFICE

Application of Elie Aghnides
Ser. No. 328,120

Before the Board of Appeals

Appeal No. 41,853

Hon. Commissioner of Patents
Washington, D. C.

Sir:

The above entitled appeal has been set for hearing June 1, 1942. It is respectfully requested that another date be set for the hearing because of the inability of the applicant to be present on account of another engagement. The applicant desires to make certain tests in the presence of the Board. Under date of yesterday, he writes that the Inventor's Exposition in New York, where applicant resides, will open on June 1, and that he has made arrangements to demonstrate to certain people at that time, another invention relating to an implement of war and for that reason cannot be present. The clerk advises that the case can be set for July 1, 1942.

Respectfully submitted,

May 26, 1942

John Berg
Attorney

37

Plaintiff's Exhibit 17

[illegible]01-a

2 App. 185

ADDRESS ONLY
THE COMMISSIONER OF PATENTS
WASHINGTON, D. C.

Paper No. 12

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

May 27, 1942

Sir:

The case of Elie Aghnides

Appeal No. 41,833

Serial ~~Interference~~ No. 328,120, will be heard by the Board of Appeals on the 1st day of July, 1942.

The hearings will commence at 9.30 A. M. and as soon as the argument in one case is concluded the succeeding case will be taken up.

If any party, or his attorney, shall not appear when the case is called, his right to an oral hearing will be regarded as waived.

The time allowed for arguments is as follows:

Ex parte cases, thirty minutes;
Inter partes appeals: Interlocutory and final hearings when no testimony has been taken, thirty minutes each side; final hearing when testimony has been taken, one hour each side.

By special leave, obtained before the argument is commenced, the time may be extended.

The appellant shall have the right to open and conclude in inter partes cases, and in such cases a full and fair opening must be made.

Briefs in inter partes appeals must be filed in accordance with the provisions of Rules 144 and 163, as amended.

Respectfully,

Commissioner of Patents.

To

To Mr. John Boyle, Jr.
801 Washington Loan & Trust Bldg.
Washington, D. C.

328,120

U.S. GOVERNMENT PRINTING OFFICE 11—10004

 Plaintiff's Exhibit 17

#13

JUL 3 1942
U. S. PATENT OFFICE

IN THE UNITED STATES PATENT OFFICE

In re application of :
ELIE AGHNIDES : Before the
Serial No. 328,120 : Board of Appeals
Filed Apr. 5, 1940 :
FLUID MIXING DEVICES :

-----ooo-----

B R I E F

The invention forming the subject matter of the appealed claims is an improvement upon applicant's prior patent 2,210,846. This is the only reference that is now relied upon by the Examiner. The ground of rejection is stated in the first three lines of the Examiner's Statement to be that of double patenting. Applicant's patent was granted only after an appeal to the Board of Appeals, and much of the reasoning upon which the Examiner had heretofore finally rejected applicant's patent is to be found in the reasoning of the statement by the Examiner on appeal.

The invention of this application relates to a device that is applied to a water faucet for the purpose of making a jet of water containing air bubbles disseminated throughout the jet. In this application the bubbles are of such a size that they will be retained in the flowing jet on discharge but will escape precipitately from the water after disruption of the flowing jet. This distinction forms the basis of claim 19 which is the broadest claim.

The disclosure in the prior patent to applicant was of a generic type and the claims allowed were of a generic type. Claim 1 of the patent was allowed on the basis of novelty of the closing lines as follows:

3 1

"means in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet".

The remaining claims were also allowed by the Board of Appeals based on the novelty of the "means" clause at the end of each claim. The reference in that case was a British patent which pictorially bore some similarity to the patentee's device. The difference was that in the British patent a spray of water was produced instead of a bubbly jet. The reason for the difference was that the resistance of the screen in the patent was sufficient for mixing the water with air, whereas in the British patent there was not sufficient resistance to accomplish this purpose. On the basis of that difference in function, the Board allowed the claims of the patent.

In the amendment filed November 14, 1940, applicant points out the improvements that he has made and that are disclosed in this application but not disclosed in his prior patent. Briefly, what the applicant discovered was that the extent to which the bubble would remain in the jet depended on the size of the bubble, i.e. the length of time that the bubble would remain in the jet after discharge from the faucet. If the bubble is very small it will not discharge from the water upon disruption of the jet, such as takes place when the water is discharged into a glass. The water will remain cloudy as if the water was in emulsified form. However, if a certain larger size of bubble is formed the exact particulars of which are described by an example on page 6 of the specification, then the bubble will remain in the

jet "on discharge but will escape precipitately from the water after disruption of the flowing jet". This distinction between the applicant's patent and claim 19, on appeal, was stated in applicant's remarks to the amendment filed May 26, 1941, as follows:

> "The Examiner says that the Agnnices patent shows and claims the same structure having the same mode of operation as the device of the claims but this is not so. The patent discloses a device for producing a bubbly jet but does not show a device for producing the particular bubbly jet that is claimed. While he described in his patent 2,210,486 how a bubbly jet can be obtained by placing in the path of one or more streams flowing from the upstream diaphragm with substantial kinetic energy, one or more superposed fine wire mesh screens having holes of about 0.6 sq. mm., he did not disclose at that time that when resistance by the screen attains a certain degree, bubbles having different characteristics can be obtained, these bubbles also being small enough to be retained in the jet.
>
> We commend to the Examiner a careful reading of the amendatory matter on pages 1 and 2 of the last amendment. Having made the discovery that he did, that the length of time that the air bubble remained in the jet depended on the degree of division of the fluid mixture, he secured the desired division to produce the desired jet by proportioning the resistance offered by the screen to the apertured area of the diaphragm. This was not taught in the first patent and therefore claim 15 defines a specific type of bubble which is, of course, comprised in the complete range of bubbles small enough to be retained in the jet, as covered by his patent."
>
> (Note: The claim erroneously numbered 15 in the above paragraph is now appealed claim 19).

The applicant's position with respect to claim 19 can be summed up as follows: In his prior patent he made a broad disclosure for making a bubbly jet. In his present application he discloses a species not described in his prior application. Applicant is now claiming that species and differentiating it from his former patent with a means clause followed by a description of the character of the jet that is produced on discharge

namely one where the bubbles will escape precipitately from the water after disruption of the flowing jet, and that this type of jet is produced by proportioning the resistance of the down-stream screen with the cross sectional area of the up-stream orifice. This form of claim was approved by the Board in drawing the distinction of applicant's patent over the prior art. The reasoning which led to the allowance of such claims in the patent is equally applicable here. Indeed it is difficult to see how any other suitable language could be formulated to define the specific improvement that has been made. In the appeal that was heard leading up to the allowance of the patent, the Examiner took the same type of position as here. He said on page 6 of his Statement in the patent: "The functional statement does not teach how the British patent would have to be modified to obtain the result".

The remaining claims are specific to certain elements of structure disclosed in various species. Claim 15 is limited to "a foraminous member upstream the apertured diaphragm". This reads on aperture 17, Fig. 3; screen 23, Fig. 4; aperture 32, Fig. 6. Claim 16 is limited to "a restricted orifice upstream the apertured diaphragm". Aperture 17, Fig. 3; 22, Fig. 4 and 32, Fig. 6, are restricted orifices upstream the apertured diaphragms 18, 24 and 33, Figs. 3, 4 and 6 respectively. Claim 17 is limited to "a restricted orifice and foraminous member upstream the apertured diaphragm". This is shown for example in Fig. 4, 22 being the restricted orifice, and 23 the foraminous member. None of these forms are found in applicant's prior patent.

We will now take up and discuss the Examiner's actions and statements. In the Office action dated May 15, 1940, the

Examiner said "In order to point out the difference the limitations must involve structural differences, not the result". This statement was made while decision on appeal of applicant's patent was pending, and in which many of the references, if not all of them, cited by the Examiner in the first Office action were considered and disposed of by the Board of Appeals. In the second Office action, Nov. 27, 1940, the appealed application having eventuated into a patent, the claims were rejected on this patent, on the ground of double patenting. The Examiner stated: "Aghnides who shows and claims the same structure having the same mode of operation as the device of the claims. In page 2 applicant has attempted to distinguish between the results provided by the patented device and those produced by the matter of this application. While there may be a difference in degree of fineness of the air bubbles in the water such difference cannot distinguish the present claims wherein the structure set forth is the same. In order to support a second patent structure patentably distinct from that shown and claimed must be set forth". Notwithstanding the fact that the Board of Appeals disposed of this contention in reversing the position of the Examiner, it was again raised in this application. The Examiner seems to be unwilling to admit or to concede that a"means clause" suitably qualified, as it is in the patent and also in claim 19, defines structure. The doggedly adhered to position of the Examiner is that it is only such elements as chambers, screens, orifices and the like, that define structure, but the Board in the appeal on the patent disagreed with the Examiner. In the Office action dated July 26, 1941, the Examiner again reiterated his position thus:

"The language of claims 15 to 18 points out no material difference over the structure shown and claimed by the patent. The orifice 17 of Fig. 3 in this application is anticipated by analogous elements in Figs. 2, 4 and 5 of the patent. Broadly construed the restricted orifices is indistinguishable from the passage through the faucet which is inherently restricted. Claim 19 attempts to distinguish by language relating to the product. It is not apparent that this requires any change in form or proportions but if so such changes do not constitute patentable subject matter."

The Examiner does not state just what parts and elements in Figs. 2, 4 and 5 of the patent are comparable to or anticipate the orifice 17 of Fig. 3. Claim 16 for instance states that the "restricted orifice is upstream the apertured diaphragm", and no such combination is disclosed in Figs. 2, 4 and 5 of the patent. In a shift of position the Examiner then states that the "restricted orifice is indistinguishable from the passage through the faucet which is inherently restricted", but claims 15 to 18 state that the "restricted orifice and the foraminous member" which are upstream, are in the device which is adapted for connection with the discharge end of a faucet. This limitation directly precludes reading any such limitation into this claim, to say nothing about the tortured interpretation which is given to the language of the claim.

In the Examiner's Statement it is pointed out that there is a certain pictorial dimilarity between certain figures of the patent and certain figures of the application. If the figures of the drawing are merely compared without reading the descriptive portion of the specification, then of course the conclusion that is reached by the Examiner might have some support, but such a comparison between the disclosure of the application and that of the patent is unwarranted.

The Examiner admits that in the species depicted by Figs. 3, 4 and 6 of the application that "the water is however initially forced through a restricted orifice 17, 22 and 32 re-

spectfully whereby applicant states that the flow is improved and a softer jet delivered". In the next paragraph, the Examiner states "It is not pointed out that the initial jet 17, in Fig. 3 for example, has any specific effect on the water stream". Applicant is unable to reconcile these two statements.

In the closing paragraph of Sheet 3, the Examiner says - "The patent to Aghnides has, as pointed out above, substantially the same disclosure and provides the same soft jet of water". It is submitted that a reading of the specification of the application will disprove the fact that the patent and the application have substantially the same disclosure, or that the patent discloses the specific jet of water of the application. The reason for the conclusion of the Examiner is because he is merely making pictorial comparisons between the figures of the patent and that of the specification, and disregarding entirely the disclosure in the specification.

The Examiner applies claim 15 and tries to read it on applicant's patent, but admits that the patent does not have the foraminous member 17, and then disposes of his untenable position by stating that "applicant does not show wherein this element involves invention". It is very specially disclosed on p. 7 of the specification that the presence of this orifice 17 produces a more regular and softer jet. It could not be deduced by mere reasoning that this would be the effect of the orifice 17 in the combination. The Examiner then takes the position that claim 15 does not patentably differ from claim 1 of the patent, but as has been heretofore pointed out, an entirely new specific mode of operation not disclosed in the patent specification is covered by claim 15. The Examiner then goes on to say that the member 17 is totally lacking in function because he says

it could be arranged edgewise in the stream. This objection was never raised during the prosecution of the application, but why would anyone want to put the foraminous member 17 edgewise in the stream. We believe the examiner would have some difficulty in making a diagram showing the member 17 edgewise in the stream. Unless the art so compels, applicant is entitled to claim the position of the foraminous member, limited only by the fact that it is upstream the apertured diaphragm. The specification describes an operative specific embodiment and applicant is entitled to claim that embodiment in as broad language as the state of the art will permit.

We have already discussed the tortured construction of the language of claims 15, 16 and 17 when the examiner attempts to read the restricted orifice on the orifice within the faucet.

The Examiner disposes of claim 19 on the ground that the only element of structure which it recites positively is the orifice 18, the airport 19 and screen 20, and then states in the last seven lines that applicant is attempting to quantitatively limit the elements by stating the desired effects upon the water, and that this language appears to amount to no more than the last five lines of claim 1 of the patent. Of course the closing "means clauses" of claim 1 of the patent and claim 19 are directed to entirely different structures for accomplishing entirely different results. Claim 1 of the patent is a broad claim. Claim 19 of the application is directed to a species not disclosed in the patent and an improvement which embodies an important discovery. The Examiner then says -"The size of the bubbles has to be within certain limits to form a coherent jet", but admitting

arguendo that such is the case it is not seen what bearing that fact has upon the patentability of claim 19.

After the hearing, a demonstration was made before the members of the Board of Appeals. In one test, a division of the air was made in which the bubbles were so small that when the stream was directed into a glass, the very small bubbles remained in suspension in the water for some time. Another test was made where the division of the air was such as is set forth in this application. When such a jet of water was disrupted by directing the stream into a glass, the bubbles immediately disappeared. A comparison was then made by directing these two jets into a receptacle with a soap solution therein. The very fine bubbles of the first test produced a relatively small amount of soap bubbles on the surface of the water. Using the jet of applicant's invention a foam was produced much greater in quantity and in which the bubbles were uniform in size. Directing the water directly from the faucet into the soap solution produced bubbles from the impact and agitation of the water against the bottom of the receptacle, but such bubbles were not uniform in size and did not produce a lather as satisfactory as with applicant's invention. Tests were then made with and without the use of the restricted orifice, which demonstrated the benefits of this orifice as disclosed in applicant's specification.

Since the disclosure in this application produces an improvement in the jet shown in applicant's prior patent, and since that improvement was not obvious but was learned only after experimenting with the jet, it is submitted that the public ought to have the benefit of this improved disclosure, so that they can produce the best form of jet when the patent expires, and the applicant ought to have the patent on such improvement as his reward for having made this disclosure.

July 2, 1942. 328120 47

Respectfully submitted.

John Boy C. Hall

Plaintiff's Exhibit 17 2 App. 195

Paper No. 14

U. S. PATENT OFFICE
BOARD OF APPEALS
SEP 9 - 1942
MAILED

Appeal No. 41,833

MSP

Hearing:
July 1, 1942

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

Ex parte Elie Aghnides

Application for Patent filed April 5, 1940, Serial No. 328,120. Fluid Mixing Devices.

Mr. John Boyle, Jr. for applicant.

This is an appeal from the action of the examiner finally rejecting claims 15 to 19, inclusive.

Claim 15 may be taken as an example.

15. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a foraminous member upstream the apertured diaphragm.

As to claims 15 to 18, inclusive, it seems to be the examiner's position that there is no invention in the in-

48

328120

#41,833

corporation of the foraminous member 17 (Fig. 3) in the structure covered by applicant's copending patent. This restriction was used, according to the specification, to produce a more regular and softer jet, which character of jet the device was demonstrated to produce. We cannot conclude that there is no invention in the novel arrangement.

Claim 19 does not distinguish over the patent claims except as to proportioning of the size of the orifices in screen 16 or 48 and others of the patent, as well as the size of screens 20, 28, 40, 42, etc., in such a way that bubbles of such size are produced that they will be retained in the flowing jet but will escape precipitately from the water after disruption of the flowing jet.

We regard the proportioning of the sizes of the elements of the patent claims to secure the result stated as devoid of invention, that is, any skilled mechanic would see that the holes in the elements 36, 40, 42 (Fig. 4 of the patent), for instance, were properly positioned and proportioned to produce the desired effect.

We see no invention in making the openings so large that the bubbles would immediately disappear from the jet as it is received in a glass.

The decision of the examiner is affirmed as to claim 19, but is reversed as to claims 15 to 18, inclusive.

E. J. Morgan
Examiner-in-Chief)
C. R. Hazzard
Examiner-in-Chief) BOARD OF APPEALS
Examiner-in-Chief)

Mr. John Boyle, Jr.,
801 Wash. Loan & Trust Bldg.,
Washington, D. C.

September 9, 1942

Nov 13 '42 Plaintiff's Exhibit 17 2 App. 197 15/C

U. S. PATENT OFFICE
NOV 17 1942
DIVISION XXXII.

IN THE UNITED STATES PATENT OFFICE

Applicant Elie P. Aghnides
Ser. No. 328,120
Filed April 5, 1940
For Fluid Mixing Devices

Div. 32

Honorable Commissioner of Patents,

Sir:

Please amend the above entitled application as follows:

Cancel from the drawing Figs. 1, 2 and 5. Renumber Figs. 3, 4 and 6 as 1, 2 and 3, respectively.

Cancel beginning page 1, line 7 of the specification, after the period, up to page 3, line 5, including the amendments thereto.

Page 1, line 4, before the period, insert -and is an improvement on my patent 2210,846 granted Aug. 6, 1940-.

Page 3, cancel the last line.

Page 4, line 1, cancel ",2-6" and substitute -2 and 3-.

Cancel page 4, lines 2-22 inc.;

Page 4, line 23, cancel "3" and substitute -1-; line 25, before "except" insert -of my aforesaid patent-; line 27, cancel "4" and substitute -2-.

Page 5, cancel lines 1-5 and line 19 to end of page; line 6, cancel "6"and substitute -3-; line 7, cancel -"Figs. 1 and 3/and substitute -Fig. 1-.

Cancel page 6; and page 7, lines 1-13 inc; and lines 26-34.

Page 7, line 15, cancel "3" and substitute -1-; line 15, cancel "4" and substitute -2-; line 21, cancel "4" and substitute -2-. Page 8, cancel all but the last three lines.

Cancel claim 19.

328120

2 App. 200 **Plaintiff's Exhibit 17**

Div. 32 Room 511 Paper No. 17

Address only "The Commissioner of Patents, and not any official by name

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
RICHMOND, VA.

All communications respecting this application should give the serial number, date of filing, and name of the applicant

Please find below a communication from the EXAMINER in charge of this application.

P.N:C.

Commissioner of Patents.

☆ GPO 16-27315-1

Jonn Boyle, Jr.
801 Washington Loan & Trs.
Washington, D. C.

Applicant: Elie Agnnides

Ser. No. 328,120
Filed Apr. 5, 1940
For FLUID FILING DEVICES

MAILED
NOV 19 1942

Amendment Nov. 13, 1942.

The removal of Figs. 1, 2 and 5 would leave Figs. 3, 4 and 6 in one corner of the sheet. The draftsman therefore, states that these figures must be relocated on the drawing. A new drawing with these figures only is required.

The Statutory period continues to run from the decision of Sept. 9, 1942.

JRH.

Examiner.

328120

53

Plaintiff's Exhibit 17 2 App. 201

#18

U.S. PATENT APPLICATION DIV. DEC 11 '42 U.S. PATENT OFFICE

IN THE UNITED STATES PATENT OFFICE

U.S. PATENT OFFICE DEC 15 1942 DIVISION XXXII.

Applicant Elie Aghnides
Ser. No. 328,120
Filed Apr. 5, 1940
Fluid Mixing Devices

Div. 32
Room 511

Honorable Commissioner of Patents,

Washington, D. C.

Sir:

In response to the Office Action dated Nov. 19, 1942, cancel the present sheet of drawings and substitute the following.

Dec. 10, 1942

Respectfully submitted,

John Doyle

Attorney

Original Division 32

54 328120

Plaintiff's Exhibit 17

#19

32

TITLE REPORT

No. 320120 C. P.

Name Elie Agnides

The title appears from the assignment records to be vested in:

Inventor

Examined up to and including Dec. 3, 1942

This certificate dated Dec. 10, 1942.

Grattan Purcell

Asst. Chief of Assignment Division.

S

No further assignments appear to have been received for record including

GOVERNMENT PRINTING OFFICE 11—9778

Plaintiff's Exhibit 17 2 App. 203

ADDRESS ONLY
THE COMMISSIONER OF PATENTS
WASHINGTON, D. C.

181—R

PRN: CA
Serial No. 328,120

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE

DEC 23 1942

RICHMOND ~~WASHINGTON~~ VIRGINIA

ELIE P. AGHNIDES

Your APPLICATION for a patent for an IMPROVEMENT in FLUID MIXING DEVICES filed Apr. 5, 1940 has been examined and ALLOWED with 4 claims.

The final fee, THIRTY DOLLARS ($30), WITH ONE DOLLAR ($1) ADDITIONAL FOR EACH CLAIM ALLOWED IN EXCESS OF 20 (no less sum can be accepted), must be paid not later than 6 MONTHS from the date of this present notice of allowance. If the final fee be not paid within that period, the patent will be withheld; SEE REVISED STATUTES, SECTION 4885 AS AMENDED BY ACT OF CONGRESS APPROVED AUGUST 9, 1939.

The office delivers patents upon the day of their date, on which date their term begins to run. The preparation of the patent for final signing and sealing will require about 4 weeks, and such work will not be begun until after payment of the necessary final fee.

When the final fee is paid, there should also be sent, DISTINCTLY AND PLAINLY WRITTEN, the name of the INVENTOR, TITLE OF THE INVENTION, AND SERIAL NUMBER AS ABOVE GIVEN, DATE OF ALLOWANCE (which is the date of this circular), DATE OF FILING, and, if assigned, the NAMES OF THE ASSIGNEES.

If it is desired to have the patent issue to an ASSIGNEE OR ASSIGNEES, an assignment containing a REQUEST to that effect, together with the FEE for recording the same, must be filed in this office on or before the date of payment of the final fee.

The final fee will NOT be received from other than the applicant, his assignee or attorney, or a party in interest as shown by the records of the Patent Office.

Attention is called to Executive Order No. 8389 of April 10, 1940, as amended, and General License No. 72 issued thereunder. If a foreign country designated in the Order, or any national thereof, has, on or since the effective date of such Order, had an interest of any nature whatsoever, direct or indirect, in this application or in the letters patent to be issued thereon, a report on Form TFR-172 must be filed with the Treasury Department at least 20 days before the payment of the final fee. Copies of Form TFR-172 may be obtained from any Federal Reserve Bank, the Governor or High Commissioner of any territory or possession of the United States, or from the Division of Foreign Funds Control, Treasury Department, Washington, D. C.

Respectfully,

Commissioner of Patents.

John Boyle, Jr.
801 Washington Loan & Trst.
Washington, D. C.

5-6

328120

UNCERTIFIED CHECKS WILL NOT BE ACCEPTED

16—25069-1 U. S. GOVERNMENT PRINTING OFFICE

2 App. 204 Plaintiff's Exhibit 17

PATENTEE OF INVENTIONS
INTERNATIONALLY LICENSED

WICKERS 1-4000

E. P. AGHNIDES

ENGINEER--INVENTOR

527 LEXINGTON AVENUE

NEW YORK

MEDAL AT THE UNIVERSAL
EXHIBITION OF BRUSSELS

B

1-43 12600 30.00

March 17,1943

Commissioner of Patents
Department of Commerce
United States Patent Office
Richmond,Virginia

Dear Sir:

Serial No. 328,120 - PRN:CA

In reply to your communication of December 23,1942, I beg to enclose a check of $30.00 to cover the final fee for the patent granted me for "Fluid Mixing Devices".

Respectfully yours,

E P Aghnides

Form APC-13P,duly notorized and signed is herewith attached.

328120

Plaintiff's Exhibit 17 2 App. 209

Form APC-13P
November 17, 1942

UNITED STATES OF AMERICA

OFFICE OF ALIEN PROPERTY CUSTODIAN

Washington, D. C.

For Reporting Certain Patent Applications

Inventor Elie T. Aghnides

Citizenship Greek

Address Shelton Hotel Lexington Ave. at 49 New York, N.Y.

Title of Invention FLUID MIXING DEVICES

Serial Number 328,120 PRN: CA

Assignee

Citizenship

Address

Interest Transferred

Date of Oath

Interest in the Invention or Application which is held by the reporter (if other than the Assignee)

Name of person forwarding to reporter (if other than inventor or Assignee)

Address

Signed

Address

I, Elie P. Aghnides, do solemnly swear (or affirm) that the statements made in answer to the foregoing questions are true and complete to the best of my knowledge and belief.

Elie P. Aghnides

(Title)

Subscribed and duly sworn to before me this Seventeenth day of March, 1943 at the city of New York, County of New York and state of New York, Kathryn L. McEnroe

TO BE FILLED IN BY PATENT OFFICE

Above application filed on

and received Serial Number

This [illegible]
entered [illegible]
to which it is [illegible]

C. L. Roberts
Chief, Application Division

Form 700

District Court of the United States

DISTRICT OF Middle District of North Carolina

COMMISSIONER OF PATENTS
MAR - 1 1953
DEPT.

HONORABLE COMMISSIONER OF PATENTS,
Washington, D. C.

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 3rd day of March, 1953, in this court an action, suit, or proceeding No. 728 G., entitled:

Name Elie P. Aghnides, Plaintiff,

Address 46 West 54th Street, New York 19, New York

versus

Name The Meyer's Company, Defendant,

Address Greensboro, North Carolina

brought upon the following patents:

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,210,846	Aug. 6, 1940	Elie P. Aghnides
2	2,316,832	April 20, 1943	Elie P. Aghnides
3			
4			
5			

In the above-entitled case, on the ..... day of ....., 193 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree issued:

IN WITNESS WHEREOF I have affixed my hand this 3rd day of March, 1953, at Greensboro, North Carolina

Henry Reynolds
Clerk of said Court.

By [signature]
Deputy Clerk

U. S. GOVERNMENT PRINTING OFFICE 7—2016

AO Form 120

In Re Patents

United States District Court

for the

Southern District of New York

COMMISSIONER OF PATENTS,
Washington 25, D. C.

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392; 35 USC 70), you are advised that there was filed on the 3rd day of June, 19 53, in this court an action, suit, or proceeding No. Civ. 85-272, entitled:

Name Marshall Metal Products Inc. (New York), Plaintiff,

Address The Meyer's Company (North Carolina)

versus

Name Elie P. Aghnides, Defendant,

Address New York

brought upon the following patents:

PATENT NO.	DATE OF PATENT	PATENTEE
1 2,210,846	Aug. 6, 1940	To deft.
2 2,316,832	Apr. 20, 1943	" "
3		
4		
5		

In the above-entitled case, on the ..... day of ....., 19 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

PATENT NO.	DATE OF PATENT	PATENTEE
1		
2		
3		
4		
5		

In the above-entitled case the following decision has been rendered or decree issued:

.....

.....

.....,
Clerk.

Date June 3rd, 19 53. By .....,
Deputy Clerk.

Form 760

District Court of the United States

DISTRICT OF MIDDLE DISTRICT OF NORTH CAROLINA

SOLICITOR

HONORABLE COMMISSIONER OF PATENTS,
Washington, D. C.

AUG 5 - 1954

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392), you are advised that there was filed on the 6th day of July U. S. PATENT OFFICE, 1954, in this court an action, suit, or proceeding No. 857-G, entitled:

Name Elie P. Aghnides, Plaintiff,

Address New York 19, N. Y.

versus

Name S. H. Kress & Co., Defendant,

Address Greensboro, N. C.

brought upon the following patents:

B

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,210,846	August 6, 1940	Elie P. Aghnides
2	2,316,832	April 20, 1943	Elie P. Aghnides
3			
4			
5			

In the above-entitled case, on the ..... day of ....., 193 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or decree issued:

IN WITNESS WHEREOF I have affixed my hand this 4th day of August, 1954, at Greensboro, N. C.

HENRY REYNOLDS
Clerk of said Court.

BY Betty H. Herrington
Deputy Clerk

U. S. GOVERNMENT PRINTING OFFICE 7—3016

AO Form 120

In Re Patents

United States District Court

for the

S. D. N. Y.

COMMISSIONER OF PATENTS,
Washington 25, D. C.

SOLICITOR

SIR:

SEP 21 1954

U. S. PATENT OFFICE

In compliance with the Act of February 18, 1922 (42 Stat. L. 392; 35 USC 70), you are advised that there was filed on the 16th. day of September, 1954, in this court an action, suit, or proceeding No. Civ. 95-355, entitled:

Name Melard Manufacturing Corporation, Plaintiff,

Address New York

versus

Name Elie P. Aghnides, Defendant,

Address New York

B

brought upon the following patents:

PATENT NO.	DATE OF PATENT	PATENTEE
1 2,210,846	Aug. 6, 1940	Aghnides
2 2,316,832	Apr. 20, 1943	Aghnides
3		
4		
5		

In the above-entitled case, on the ..... day of ....., 19 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

PATENT NO.	DATE OF PATENT	PATENTEE
1		
2		
3		
4		
5		

In the above-entitled case the following decision has been rendered or decree issued:

WILLIAM V. CONNELL
Clerk.

Date Sep. 20, 19 54. By Robert Tollner
Deputy Clerk.

AO Form 120

In Re Patents

(P. 214)

United States District Court

for the

NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

COMMISSIONER OF PATENTS,
Washington 25, D. C.

SIR:

In compliance with the Act of February 18, 1922 (42 Stat. L. 392; 35 USC 70), you are advised that there was filed on the 18th day of JANUARY, 1955, in this court an action, suit, or proceeding No. 55C 84, entitled:

Name MELARD MANUFACTURING CORPORATION, Plaintiff,

Address 432 Austin Place, New York

versus

Name CHASE BRASS & COPPER CO., INC., Defendant,

Address Waterbury Connecticut and doing business in Chicago, Illinois

brought upon the following patents:

PATENT NO.	DATE OF PATENT	PATENTEE
1 2,210,846	August 6, 1940	Elie P. Aghnides
2 2,316,832	April 20, 1943	Elie P. Aghnides
3		
4		
5		

In the above-entitled case, on the ..... day of ....., 19 , the following patents have been included by ..... (insert amendment, answer, cross bill, or other pleading):

PATENT NO.	DATE OF PATENT	PATENTEE
1		
2		
3		
4		
5		

In the above-entitled case the following decision has been rendered or decree issued:

.....

.....

Date January 18, 1955

H. Doumas, Clerk.

By Marquerite Johnson, Deputy Clerk.

63

32:1-0

Plaintiff's Exhibit 17 2 App. 215

421

1940

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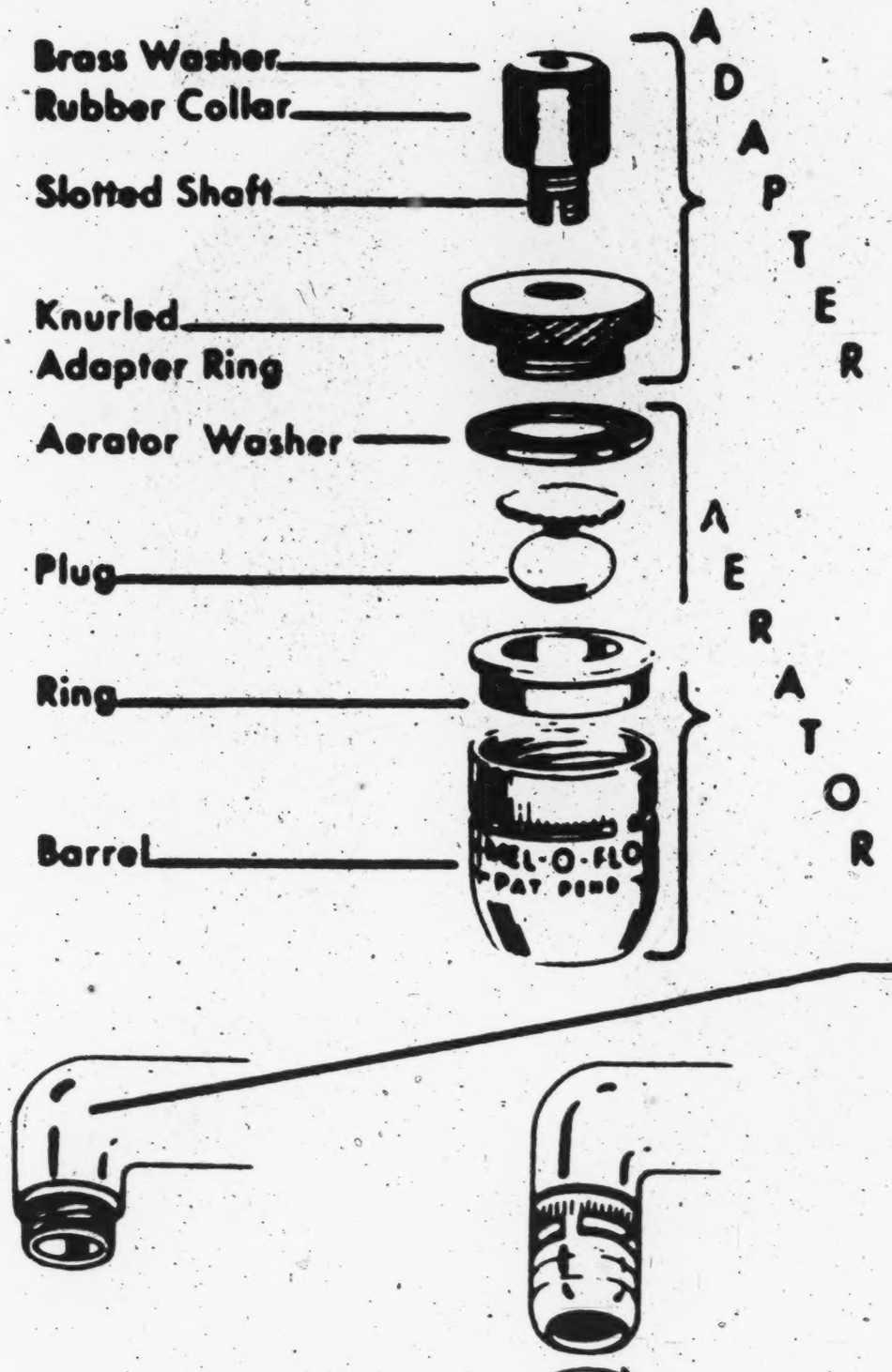
U.S. GOVERNMENT PRINTING OFFICE 16—11878

32-120



INSTALLATION INSTRUCTIONS

THE MEL-O-FLO JET-AERATOR scientifically super-charges water with BILLIONS of BUBBLES of air producing an oxygen-enriched splashless flow.

For best results follow instructions carefully.

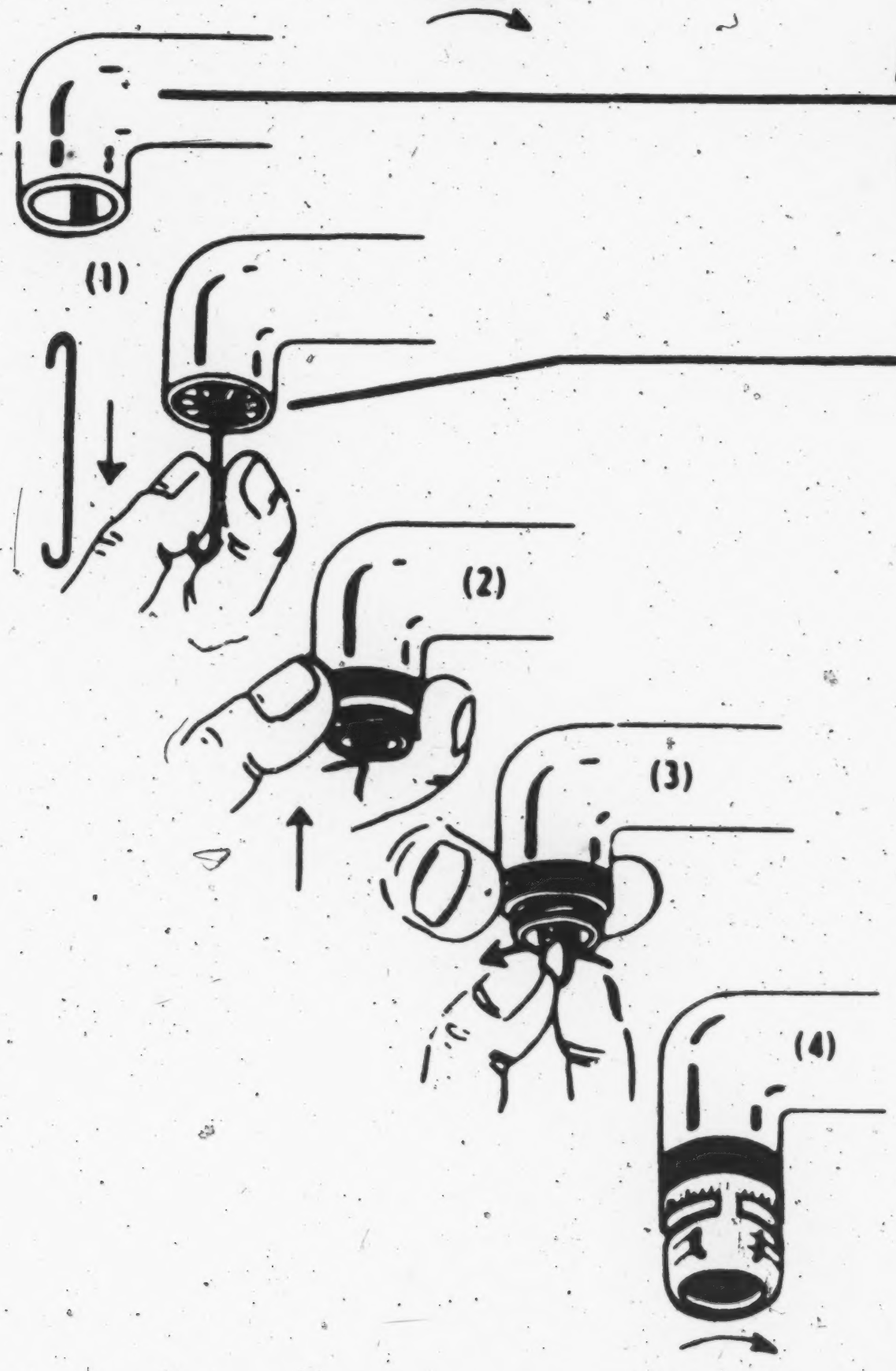
Your MEL-O-FLO JET-AERATOR ASSEMBLY contains an AERATOR plus an INTERNAL ADAPTER which connects the AERATOR to any make of faucet.

*For most faucets THREADED ON THE OUTSIDE**

use of the INTERNAL ADAPTER is not necessary. To connect, unscrew AERATOR from ADAPTER and then screw AERATOR onto the spout *using the Aerator WASHER as a seal.*

***(It may be necessary to remove a screen holder to expose the thread.)**

For faucets NOT THREADED ON THE OUTSIDE



the INTERNAL ADAPTER is required and used as follows:

(1) Inspect opening in spout.
If opening is clear, proceed to step (2).
If opening has a spring insert, remove it with a bent pin or clip by hooking the bent pin on the insert and pulling down.

(2) Unscrew AERATOR from ADAPTER and push ADAPTER ASSEMBLY into spout as far as possible. The ADAPTER should fit fairly snugly in the spout.
If Adapter *fits loosely*, unscrew SLOTTED SHAFT from KNURLED ADAPTER RING and replace black rubber collar with larger BLUE collar.
If Adapter *will not fit* into spout, unscrew SLOTTED SHAFT from KNURLED ADAPTER RING, remove black rubber collar and BRASS WASHER and replace black rubber collar with smaller RED collar, OMITTING the BRASS WASHER.

(3) Hold KNURLED ADAPTER RING stationary with one hand and turn SLOTTED SHAFT to the *LEFT* with a coin in slot until securely tightened.

(4) Screw AERATOR onto ADAPTER.

CLEANING INSTRUCTIONS

To clean, hold the KNURLED ADAPTER RING tightly with one hand and unscrew the AERATOR BARREL with the other by turning to the LEFT. Remove PLUG and RING and brush teeth of plug. If plug sticks in ring, separate by pushing plug UP through ring. Rinse all parts and replace. To reassemble place ring in barrel and drop plug into ring.

MELARD MFG. CORP • 37-25 32nd St. • Long Island City 1, N. Y.

468,687 COMPLETE SPECIFICATION 1 SHEET

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig.1

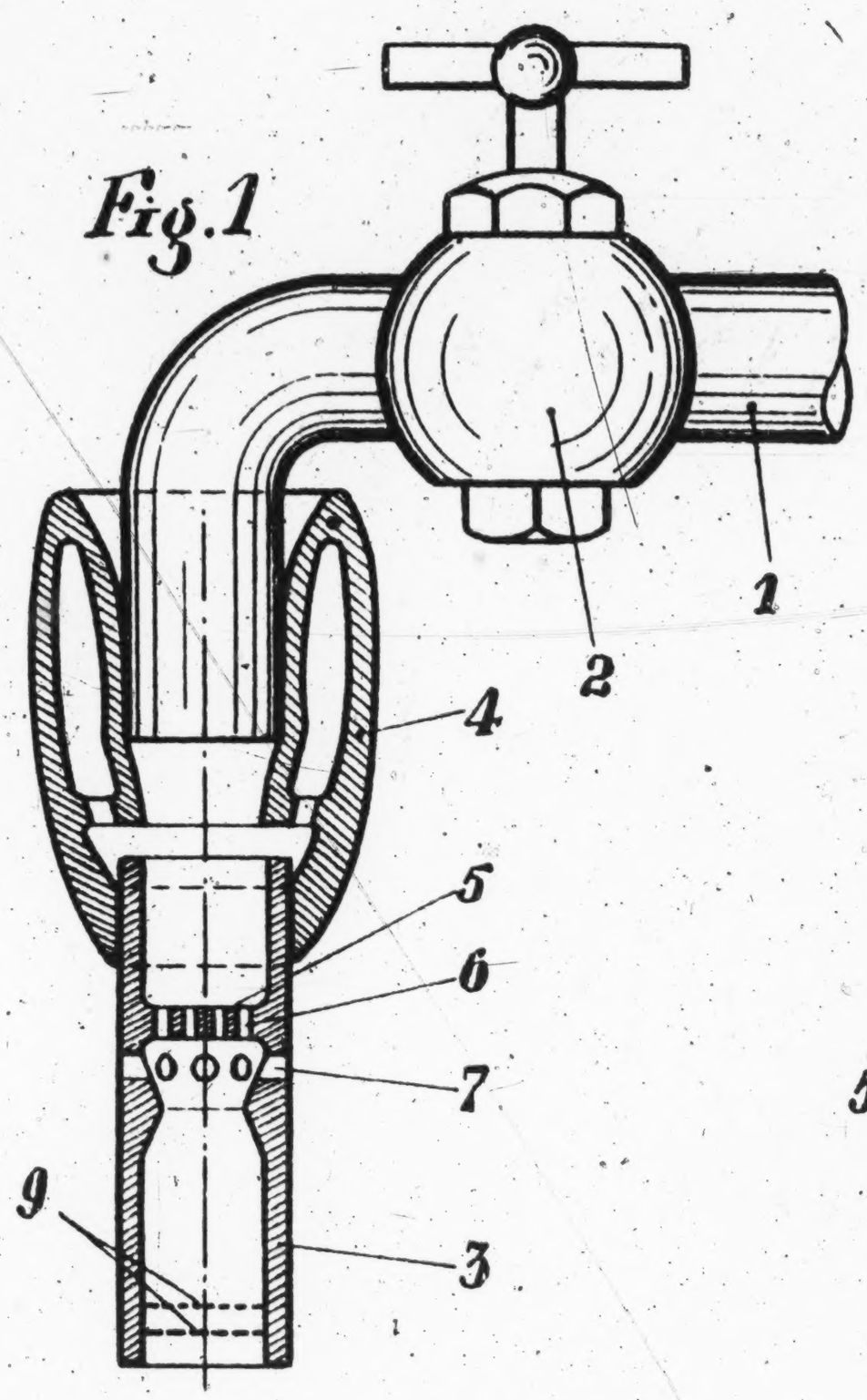


Fig.5

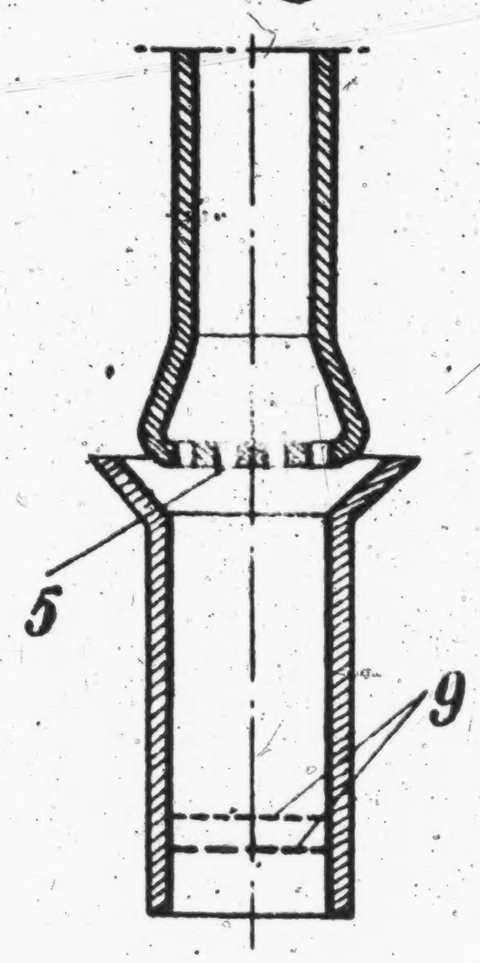


Fig.2

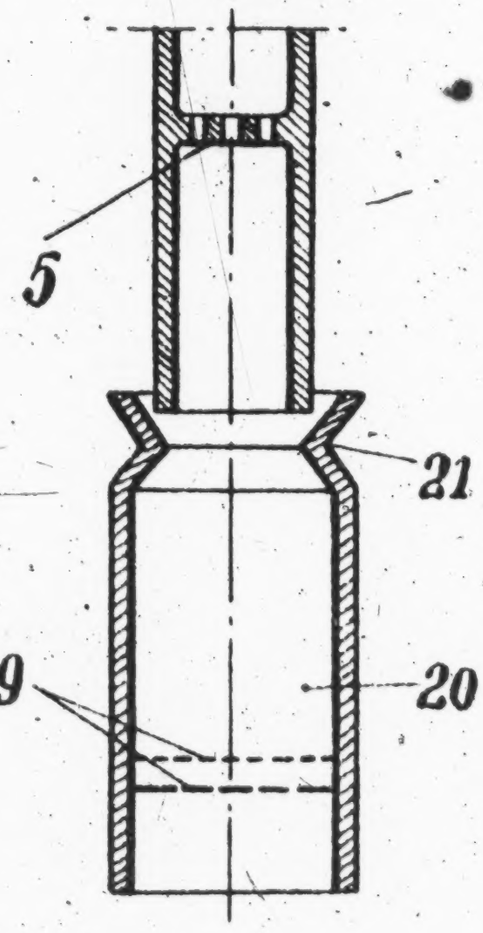


Fig.3

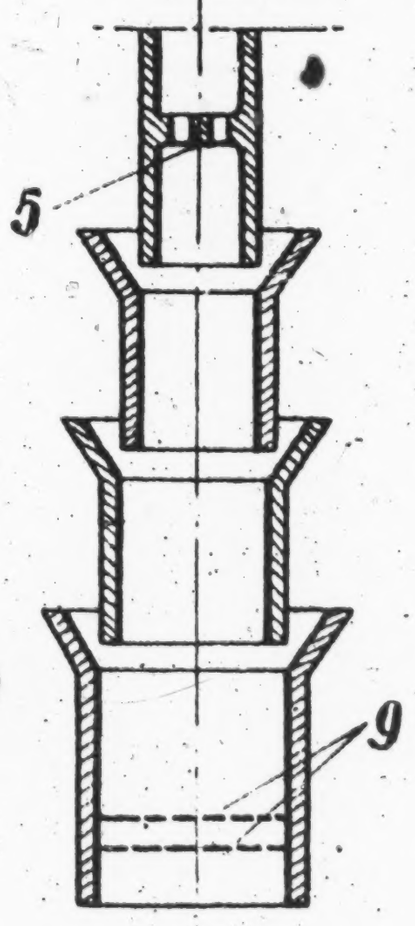
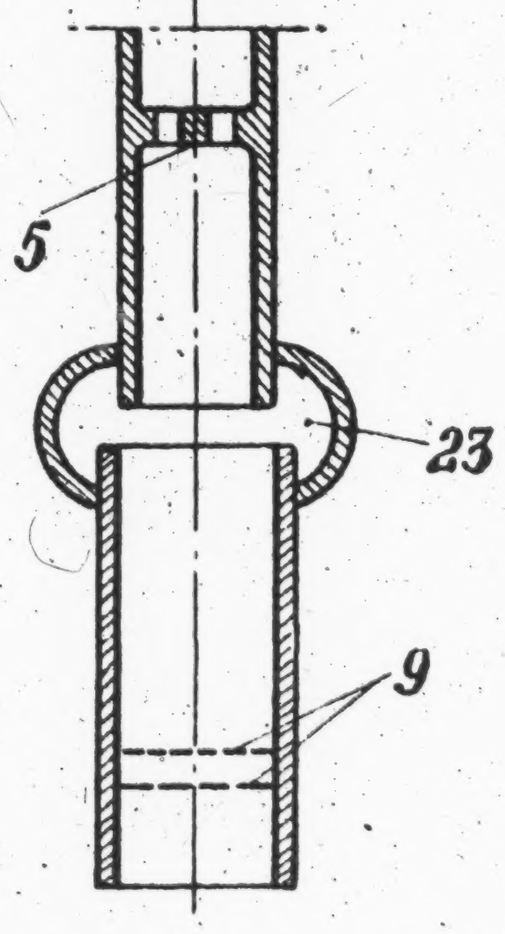


Fig.4



Malby & Sons, Photo-Litho.

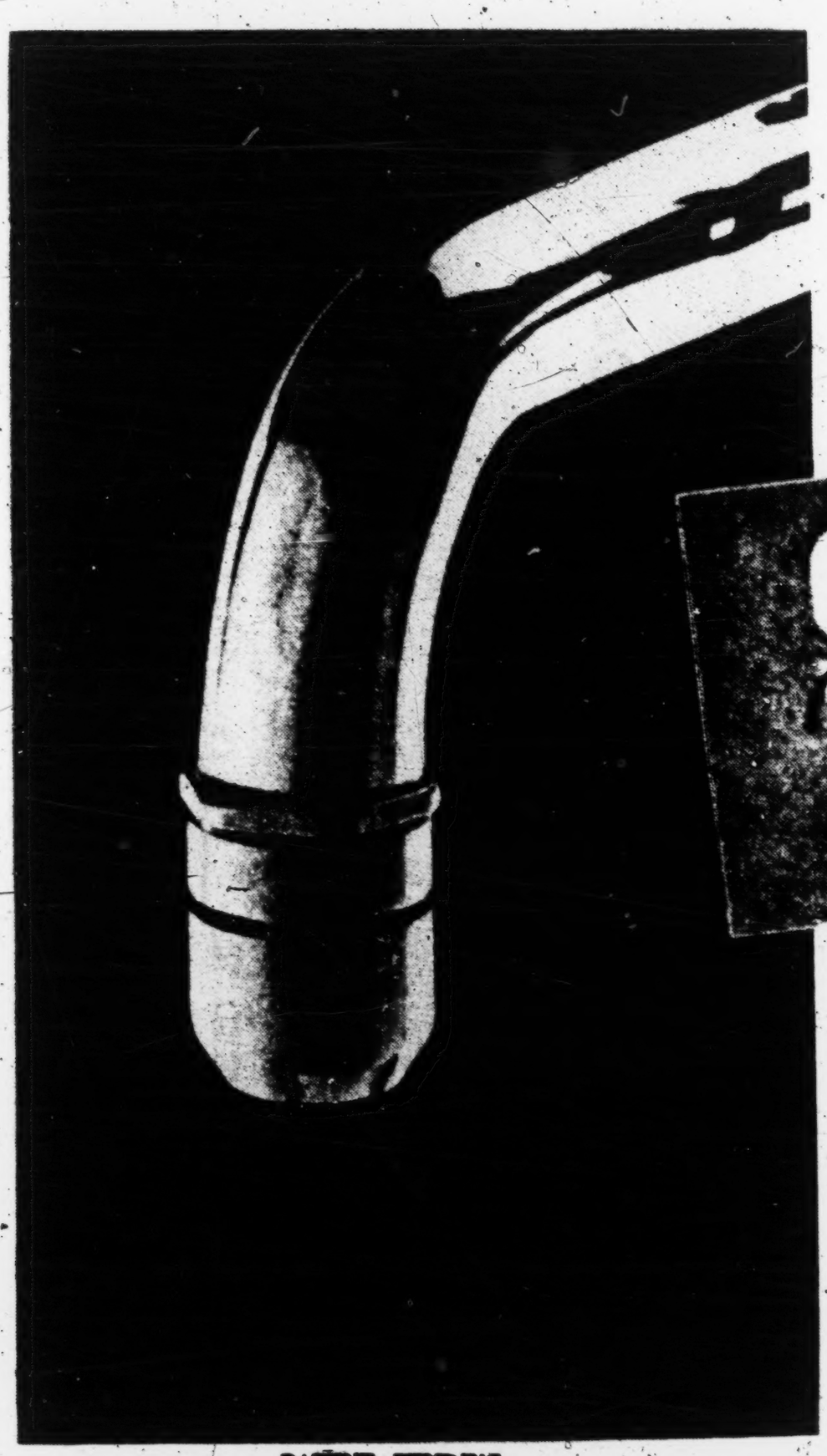
CHICAGO FAUCET NEWS

Issued Monthly by The Chicago Faucet Co., 2700-22 N. Crawford Ave., Chicago, Ill. Vol. 6, No. 5

All parts of Chicago Faucets subject to wear are incorporated in a standardized, removable, interchangeable operating unit and are as easily renewable as an electric light bulb.

NEW REVOLUTIONARY AMAZING

Improves the character of tap water!



PATENT PENDING

SOFTFLO Faucet Equipment

All Chicago Swing-Spout Sink Faucets are now available with Softflo Faucet Spout End, when so ordered, at only small additional cost.

SPLASHLESS

The Softflo Spout End works a miracle in its elimination of splashing. Its stream, even at maximum volume and at high pressure, spreads on the sink bottom or on other surfaces without splash or spatter.

NEUTRALIZES FOREIGN FLAVORS

Because of its aeration of water passing through it, it greatly neutralizes foreign tastes and odors such as chlorine or sulphur by releasing them with the air bubbles. Thus it renders water more palatable for drinking, mixing with beverages, tea, coffee or cocoa, and for cooking.

IMPARTS FEELING OF "SOFT" WATER

The function of the Softflo Spout End is to add oxygen to water passing through it. This added air is in the form of myriads of tiny bubbles, thus greatly reducing the harsh, alkaline "feel" of the water and producing lather more abundantly when mixed with soap chips or powder. It is not claimed that the Softflo transforms hard water to soft by removing the chemical elements that render it hard; but by the addition of air bubbles the water feels "soft" and agreeable to the touch.

CLARIFIES WATER

Clean water passed through the Softflo Spout End is relieved of any cloudiness or murkiness, becoming instantly clear, white and sparkling -- the result of oxygenation.

MAKE YOUR OWN TESTS

These claims are actually conservative, though they may seem hard to believe. We have no desire to impress merely the credulous. So don't accept our claims purely on our "say so." You can satisfy yourself, right in your own office or home, that the Softflo Faucet Spout End does all these things — and more. Order a faucet equipped with one today and convince yourself.

Defendant's Exhibit 26 2 App. 227

SHEET NO. _____ ACCOUNT NO. _____

TERMS NAME Aghnides Royalties

RATING ADDRESS

CREDIT LIMIT

A 5115 MADE IN U.S.A.

1938 DATE	ITEMS	FOLIO ✓	DEBITS	DATE 1938	ITEMS	FOLIO ✓	CREDITS
		VR					
Jan 19		5	8300	Dec 31	To P. L	35	33 00
Feb 3		9	8300 166.00				
Mar 2		16	8300 249.00				
Apr 5		25	8300 83200				
May 2		33	8300 41500				
Jun 1		41	8300 49800				
Jul 5		53	8300 58100				
Aug 3		60	6000 64100				
Sept 2		69	6000 70100				
Oct 3		78	6000 76100				
Nov 2		88	6000 82100				
Dec 7		97	6000 88100				

Complete Specification

True Copy

2 Sheets
Sheet /

33884

DEC 1935

Fig.1

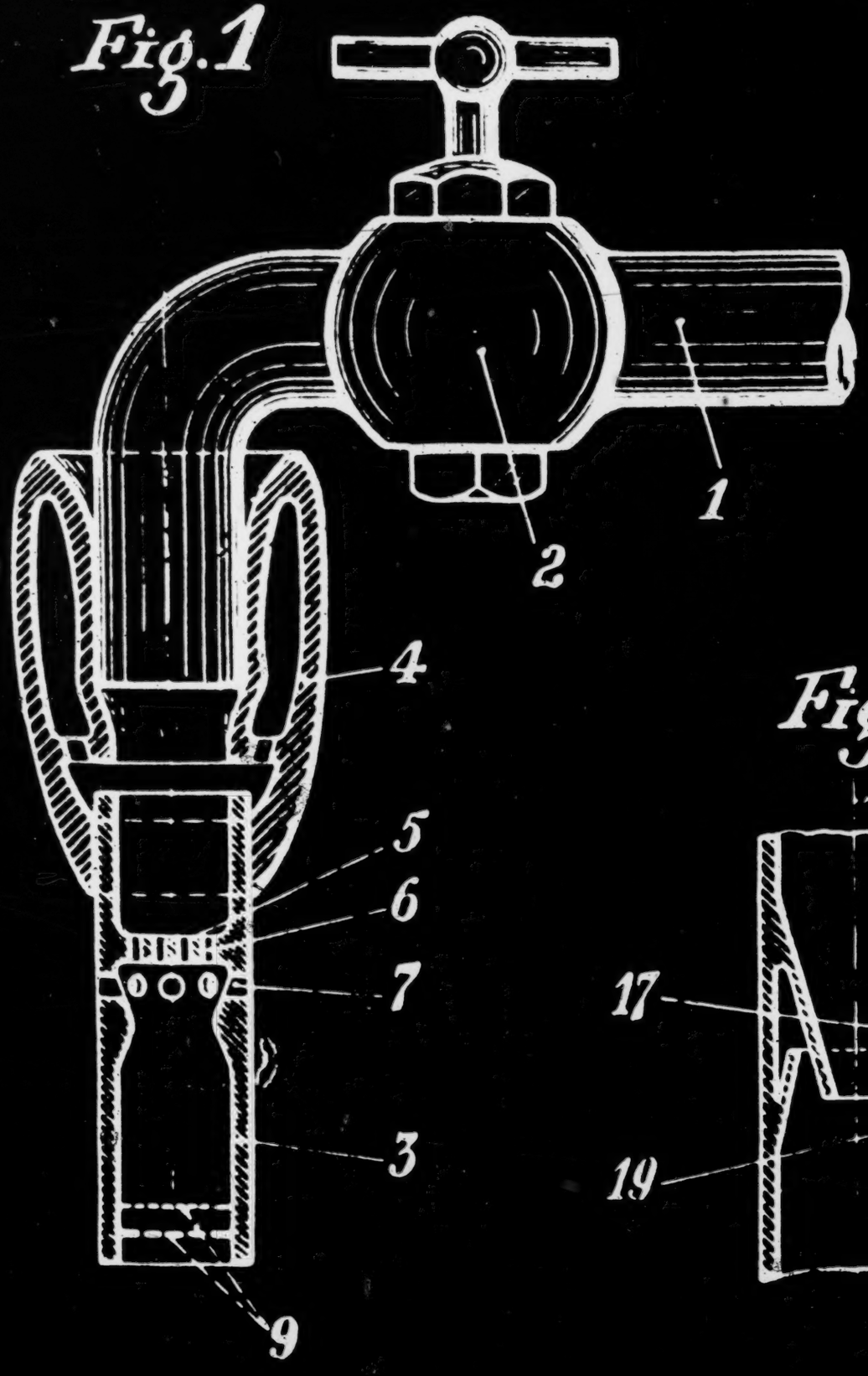


Fig.7

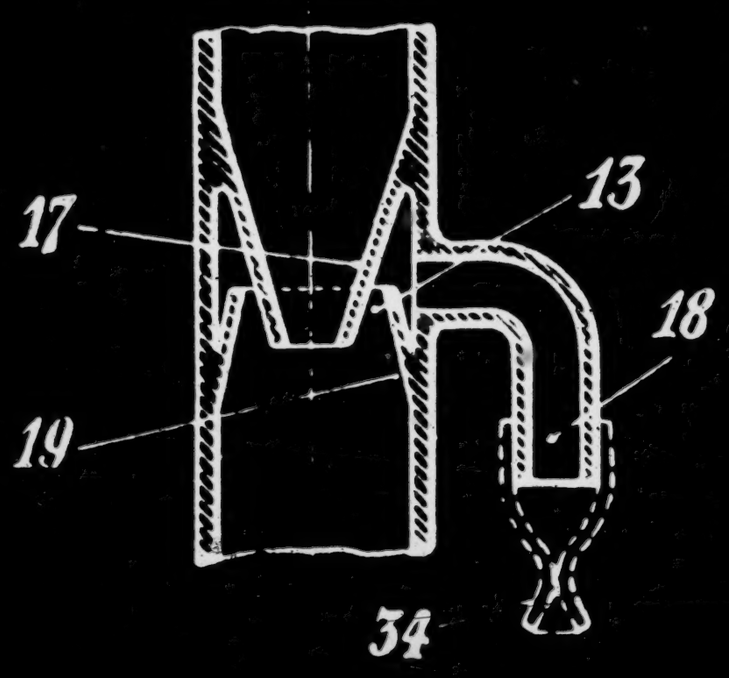
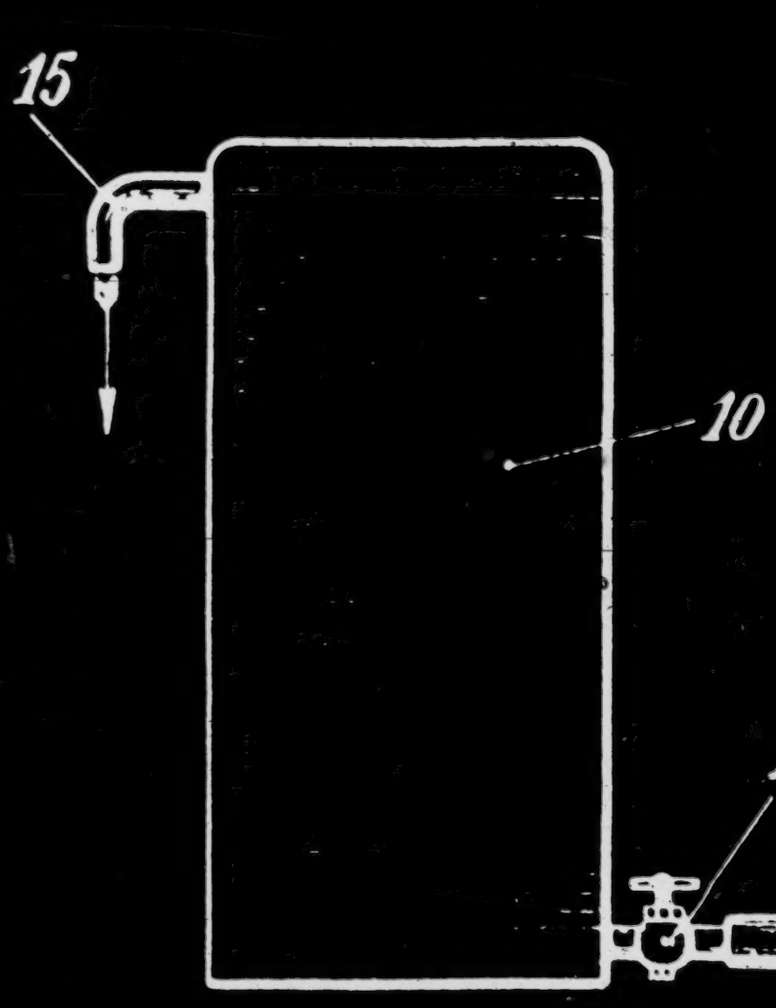
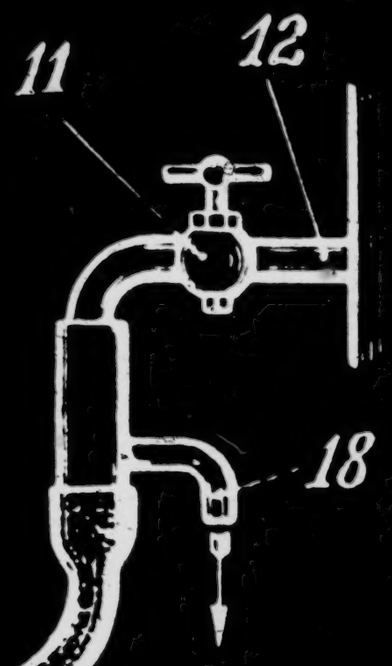


Fig.6





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Sheet 2

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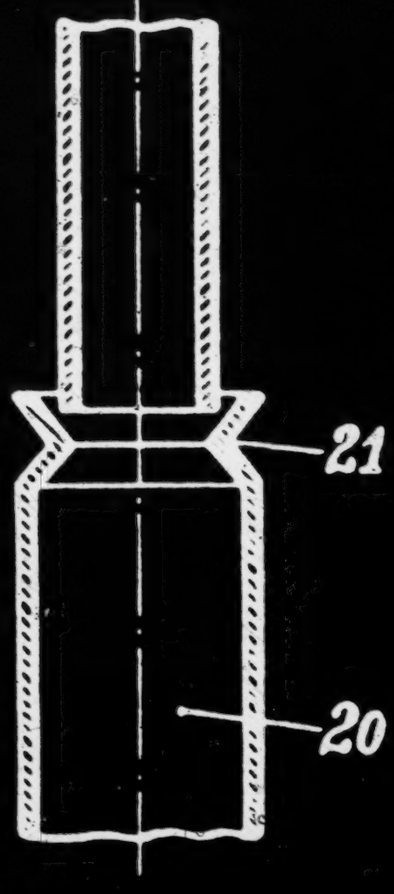
6 DEC 1935

Fig.2



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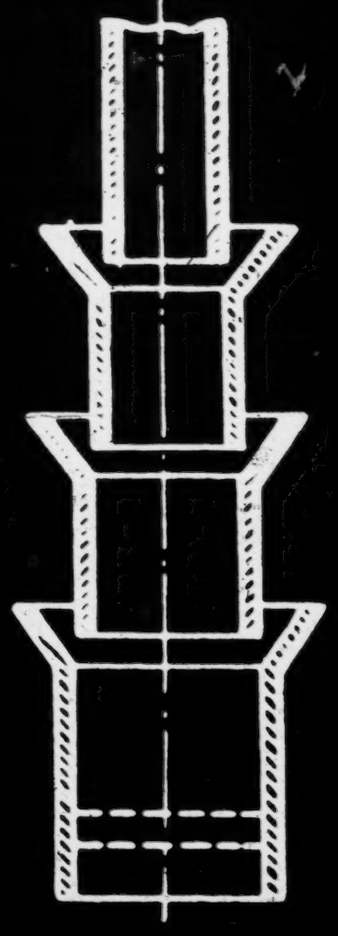


Fig.4

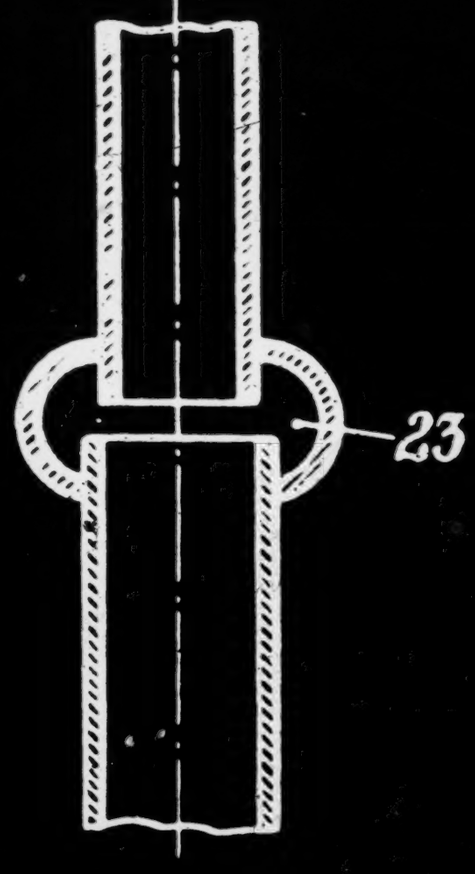


Fig.5

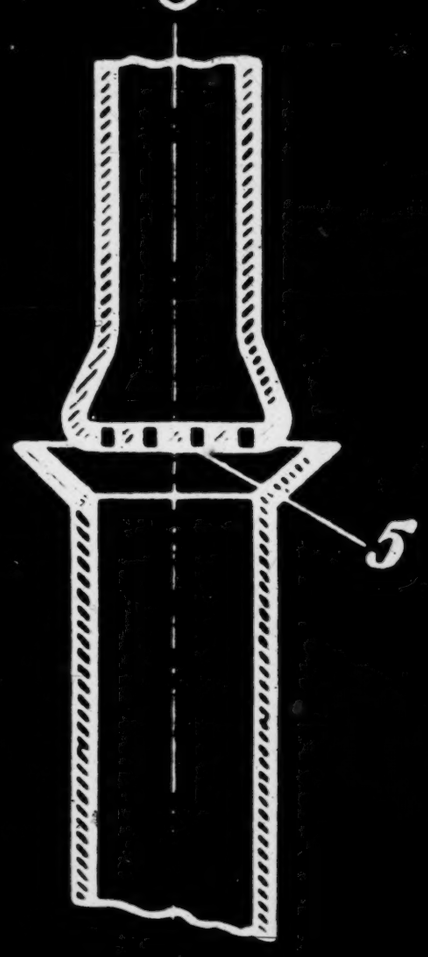
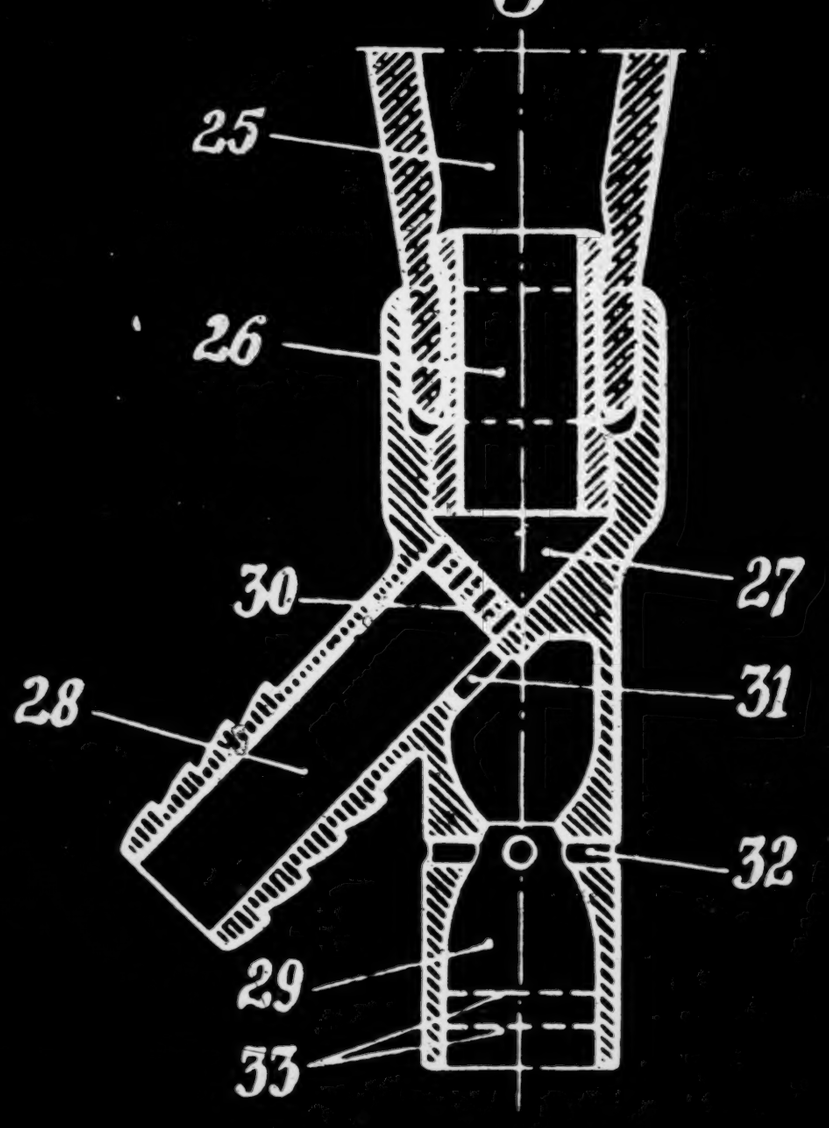


Fig.8



168687

HY. FAIRBROTHER, Agent for Applicants,
30 & 32, LUDGATE HILL, LONDON, E.C.4.

Defendant's Exhibit 44-1 2 App. 243

(No Model.) 3 Sheets—Sheet 1.

J. W. HYATT.

ART OF PURIFYING WATER.

No. 326,221. Patented Sept. 15, 1885.

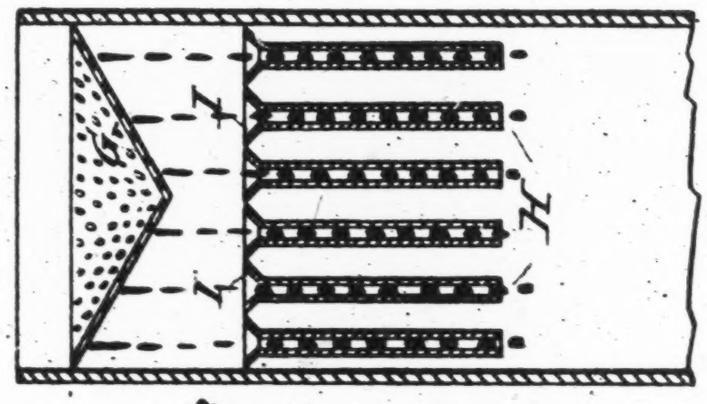


Fig. 2.

Fig. 1.

WITNESSES

Edward Wolff

George Cook

John W. Hyatt INVENTOR

By his Attorney

Rowland Cox

Defendant's Exhibit 44-1 2 App. 245

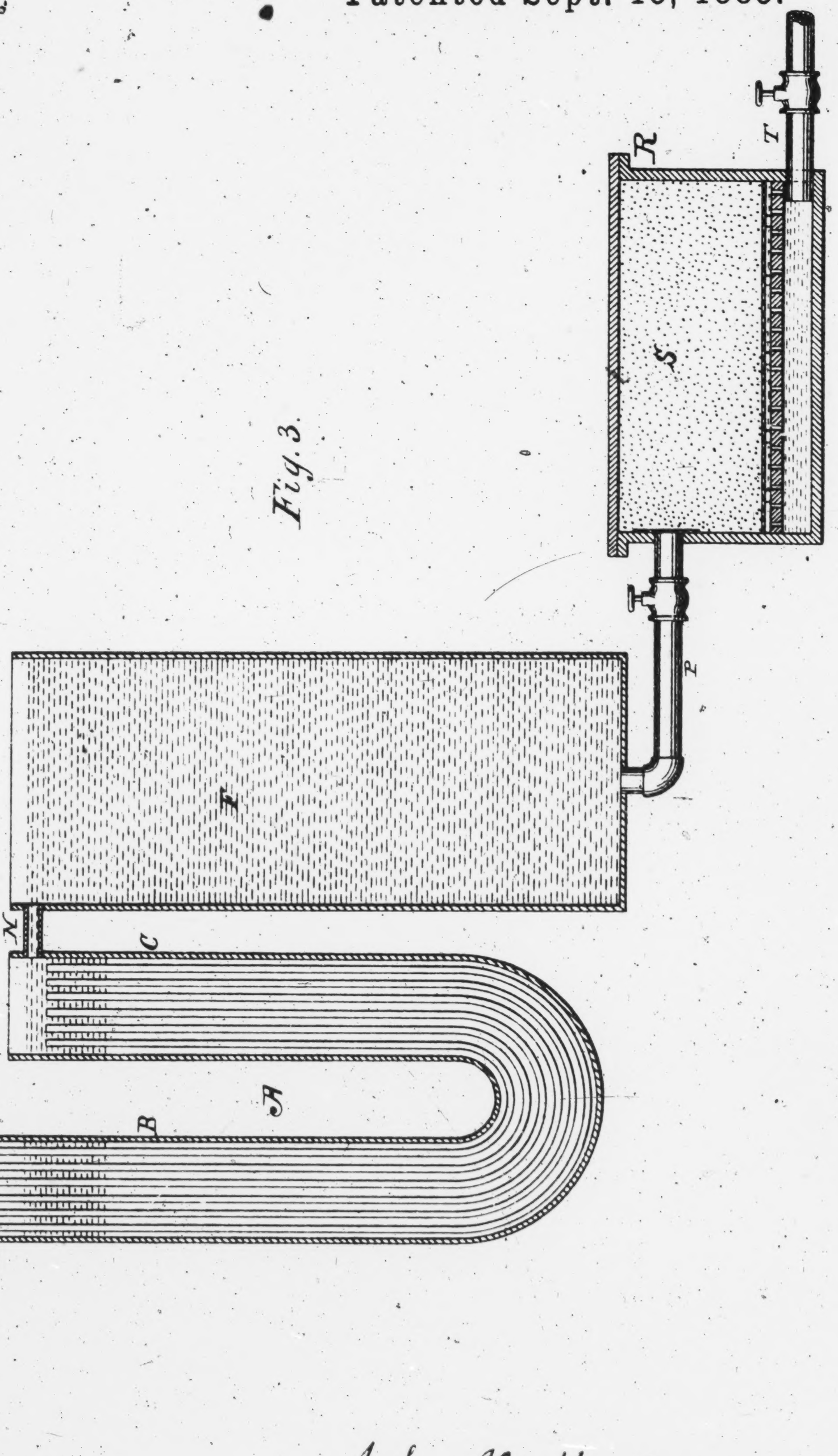
(No Model.) 3 Sheets—Sheet 2.

J. W. HYATT.

ART OF PURIFYING WATER.

No. 326,221. Patented Sept. 15, 1885.

Fig. 3.



WITNESSES

Edward Wolff

George Cook

John W. Hyatt INVENTOR

By his Attorney

Rowland Cox

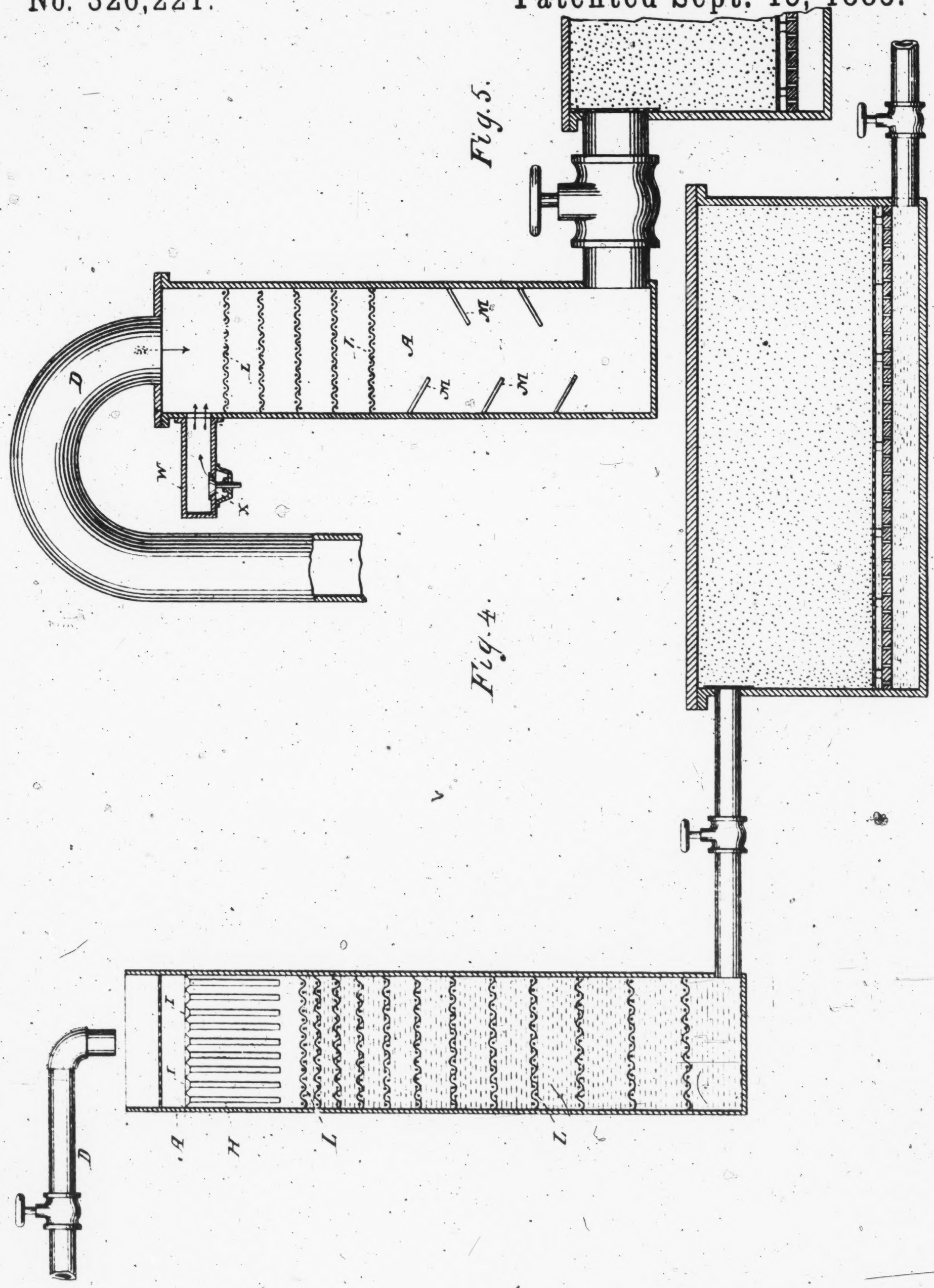
Defendant's Exhibit 44-1 2 App. 247

(No Model.) 3 Sheets—Sheet 3.

J. W. HYATT.

ART OF PURIFYING WATER.

No. 326,221. Patented Sept. 15, 1885.



WITNESSES

Edward Wolff

George Cook

John W. Hyatt INVENTOR

By his Attorney

Rowland Cox

Defendant's Exhibit 44-2

2 App. 253

(No Model.)

R. G. FERGUSON.

APPARATUS FOR MIXING LIQUIDS AND GASES.

No. 591,830. Patented Oct. 19, 1897.

FIG. 2.

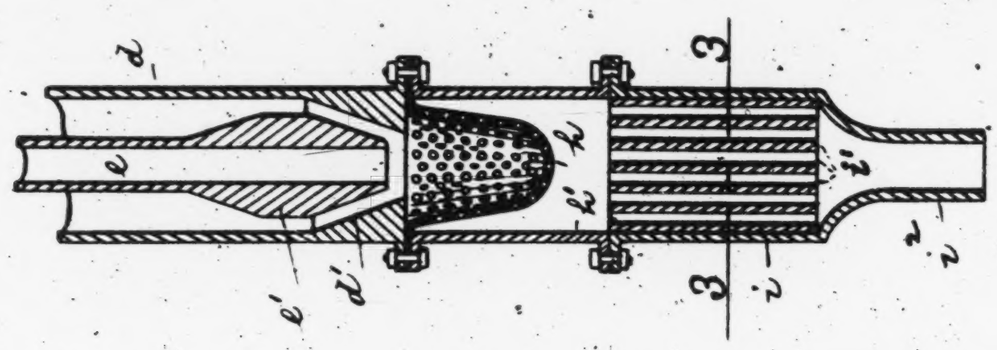


FIG. 1.

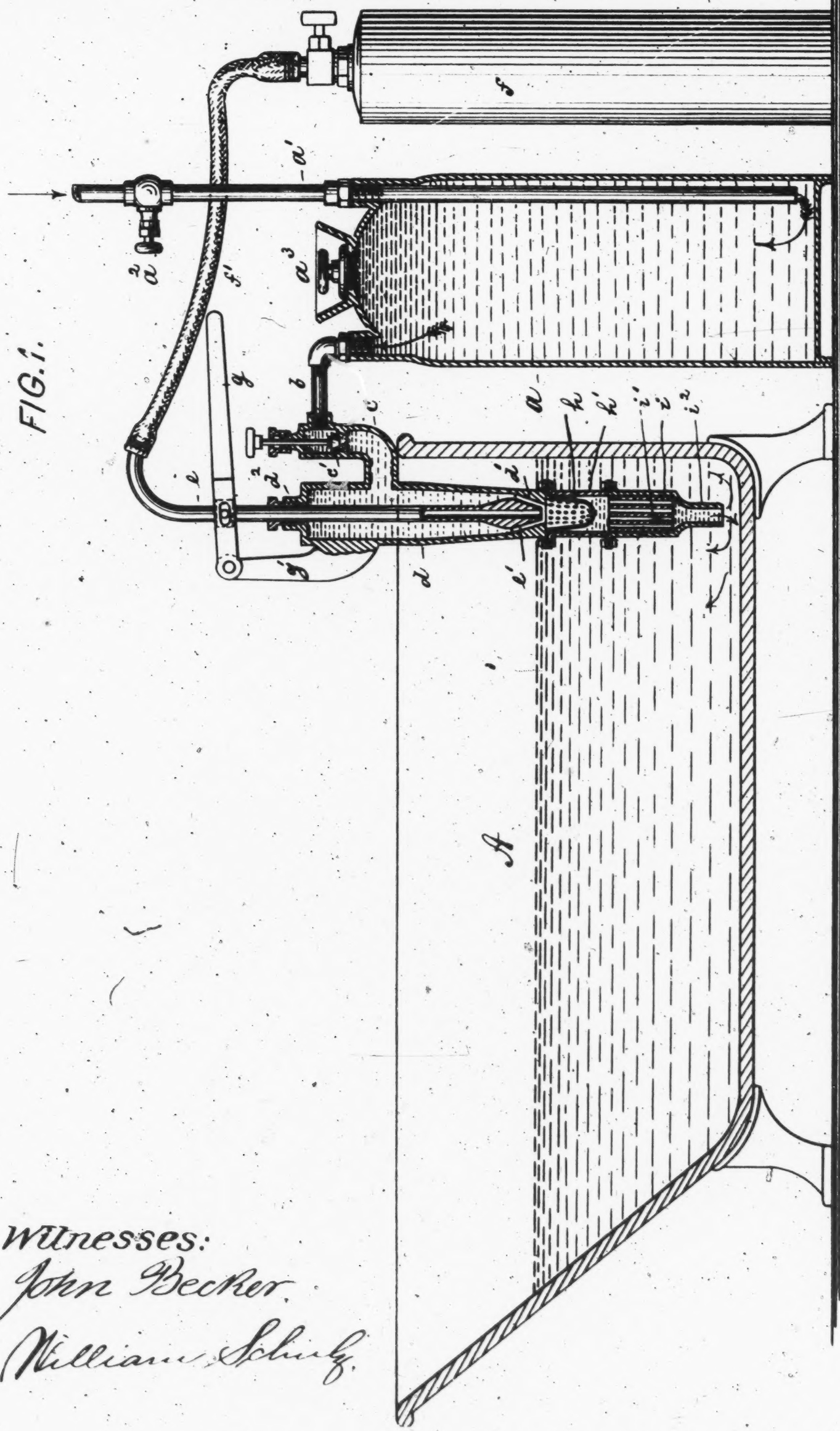
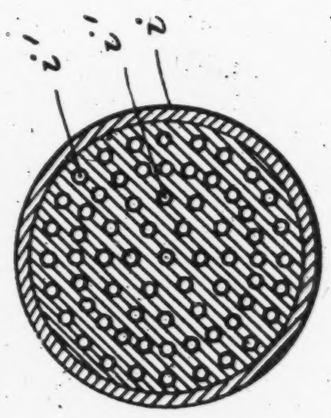


FIG. 3.



Witnesses:
John Becker.
William Schuly.

Inventor:
Robert G. Ferguson
by his attorneys
Roeder & Brieen

2 App. 257

Defendant's Exhibit 44-3

No. 881,548. PATENTED MAR. 10, 1908.

C. A. CLAFLIN.

AIR EXHAUSTING LIQUID SUPPLY APPARATUS.

APPLICATION FILED OCT. 9, 1907.

2 SHEETS—SHEET 1.

Fig. 3

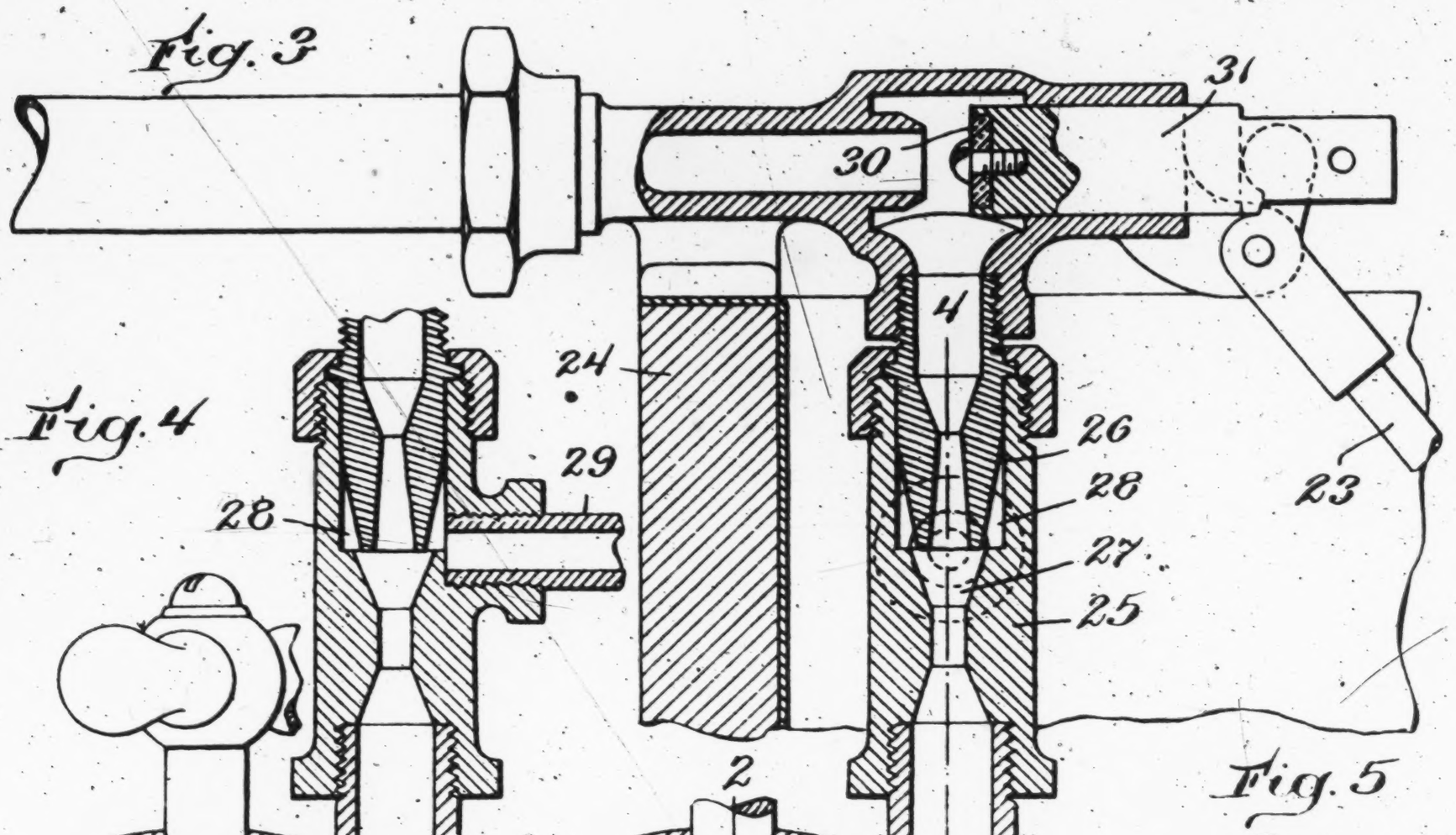


Fig. 4

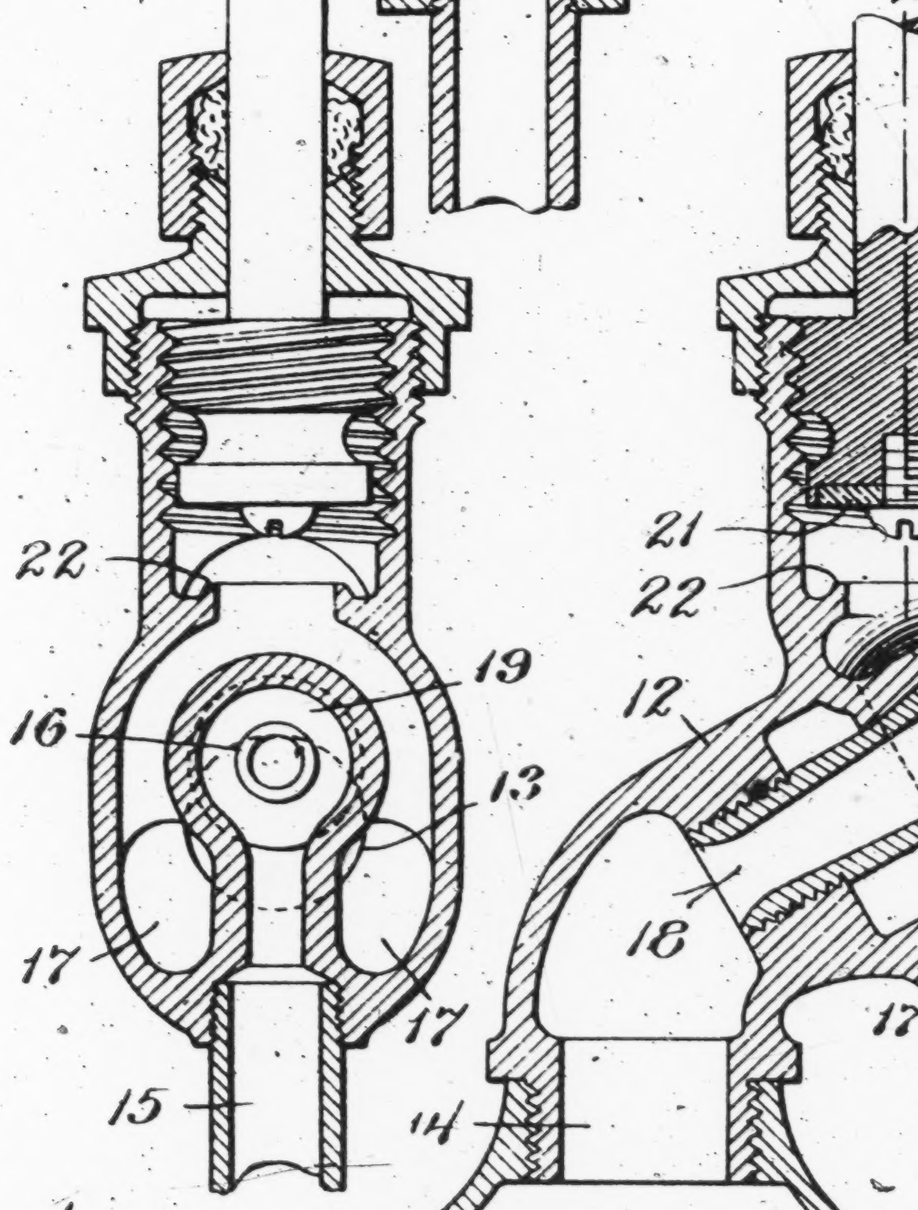


Fig. 2

Fig. 5

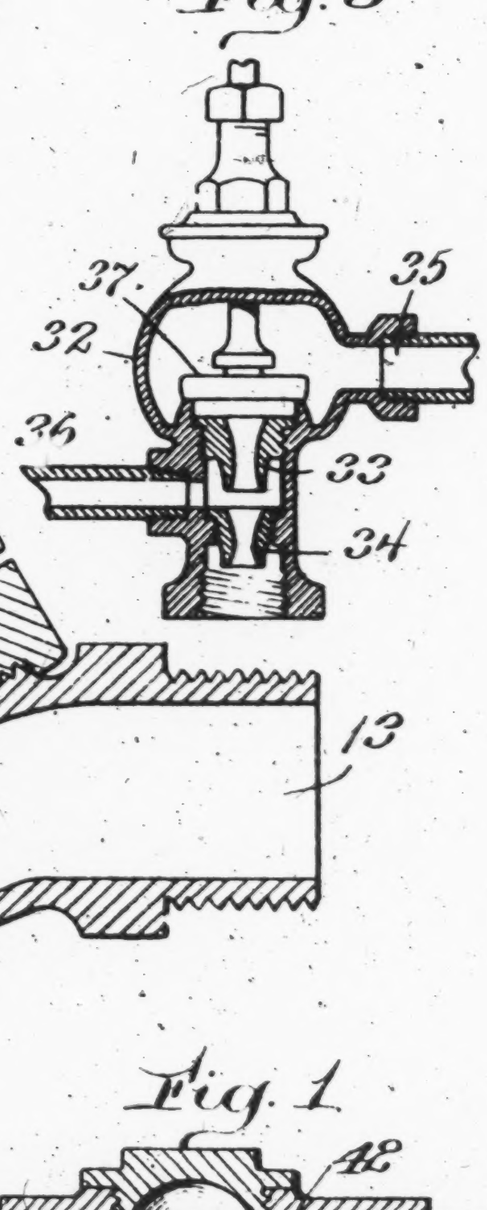
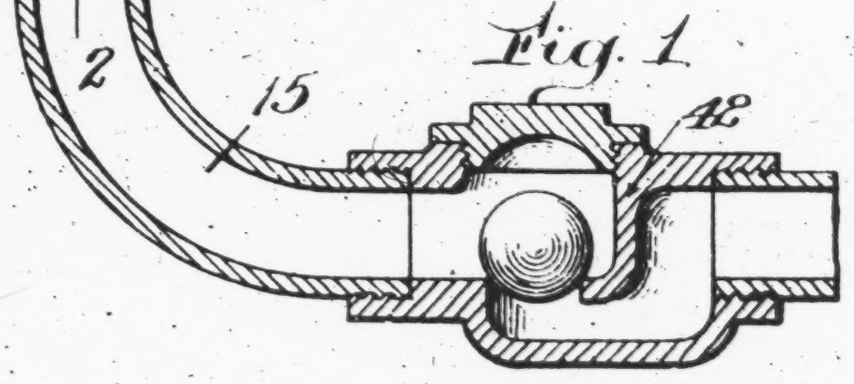


Fig. 1



Witnesses:
Peter F. Tazetta
E. Batchelder

Inventor:
Charles A. Claflin
by Wright Brown Quinby & May
Attorneys

Defendant's

[redacted]'s Exhibit 41

"A"

468687

INTERNATIONAL CONVENTION

PATENTS AND DESIGNS ACTS 1907-1932.

This specification is a copy of the specification at the date on which it became available for public inspection.

Form 3.

33884

6 DEC 1935

Complete Specification.

Fluid mixing devices in which one of the fluids is under pressure.

I, Elie Aghnides, a Greek subject, of 16, rue Capouillet, Brussels, Belgium, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

This invention relates tc a device for intimately mixing at least two fluids one of which is under pressure.

According to a general but non limitating case, atmospheric or surrounding air is intimately mixed to a circulating water column under pressure to obtain at the outlet of the device, a true water and air emulsion. The mixture thus obtained possesses remarkable qualities: the water thus charged with oxygen and carbon dioxide from the air, acquires an agreeable flavour, like water coming from a natural spring; this water is more digestive, it softens the skin and due to the simultaneous and automatic introduction of emulsed air and water realises with soap a very foamy emulsion which means better washing and a serious economy of soap and time, for instance when washing clothes. The enriching of the water in oxygen and carbon dioxide confers to the water a higher oxidising power and realizes an ionisation of the water which renders it more active.

Another practical application consists for instance in drawing off beer. Repeated experiments have proved that beer drawn off by means of carbon dioxide under pressure and compelled to run through the device according to the invention to be intimately mixed with the surrounding air, acquires a better taste and a finer appearance, the foam being more resistant.

This invention comprises all the cases in which one or more fluids (gas or liquid) have to be mixed to a circulating liquid column under pressure.

The device according to the invention comprises essentially, in combination, a cylindrical hollow body part which can be adapted to a fluid pipe under pressure, a passage in the wall of said body for entrance of another fluid in said body, by the aspiration caused by the passage of the fluid under pressure, and means below said passage, to force the fluid drawn in to mix with the fluid under pressure, the cross section of said body at said passage and the section immediately below said passage being larger than the total free section through which the fluid flows immediately above said passage.

According to an embodiment for mixing the surrounding air to a column of liquid under pressure, the passage or passages for the entrance of air may be formed by a ring of holes or slits in the walls of the tube or by an interruption in the wall, either with the part above said passage which contracts itself and eventually enters in the part below, or with the part below provided with a widening at its entrance, or still with the part above of a smaller diameter than the part below said passage.

The passage of the fluid under pressure, either at normal speed or at an artificially increased speed, creates a suction or call of air through said slits or holes and this air is drawn away by and mixed to the fluid under pressure in the pipe below said passage, provided to that end, with one or several dividing devices or baffles.

Defendant's
~~Plaintiff's~~ Exhibit 41

This process can be carried into effect in various manner and in certain cases or applications such as water softening devices it contributes to considerably simplify the plant.

In the drawings:

Fig. 1 is an axial cross-section of a water aerating device for a domestic water pipe.

Fig. 2 to 5 relate to various diagrammatic realisations.

Fig. 6 is a diagrammatic view of a domestic or other plant for treating fluids, for instance for water softening.

Fig. 7 is a cross-section at an enlarged scale, of the aerating device shown in figure 6.

Fig. 8 is a modified form of the device shown figure 6.

In figure 1, the numeral 1 indicates for instance a water pipe under pressure and 2 a tap of any type whatever. A tubular part 3 is fixed at the end of the tap; the connection can be made in any desired manner provided that is tight, and in the example this is realized by means of a special self tightening fitting 4 of a known kind.

The tubular part is provided and closed inside by means of a transversal partition 5 provided with holes 6 the object of which is to divide the current of water to increase the contacting surface between the water and the air; the total section or surface of the holes is smaller than the section through which the fluid flows at the end of the tap. Above the partition 5, in respect to the current of water, the side wall of tube 3 is provided with a ring of holes 7, the diameter of said ring being necessarily larger than the diameter of the total section of holes 6.

The manner in which the device works will be immediately understood.

Numeral 9 represents diagrammatically two perforated plates or any other dividing devices, to realize one or several chambers or spaces ensuring uniformity in the mixture before its exit.

The partition 5 may have a total section of passage equal to that of the pipe below (fig. 5), in respect to the current of water. In the same way, the holes 7 may be replaced by a complete interruption of the tubular wall as is the case in figures 2 to 5.

In figure 2, the upper pipe 20, which is larger than the pipe below, comes to an end in front of the latter in the form of a contracting-expanding part 21. In figure 3, the device is manifold and comprises several stepped air admission rings, and in figure 4 which corresponds to figure 3, the piping above and the piping below are jointed by a clip or by means of flanges 23 allowing the air to pass.

Referring to figures 6 and 7, 10 is an apparatus or tank of a known kind for softening the water which flows through it. This softening device can of course be of any desired type.

The use of those devices is becoming more and more diffused in domestic life. They are simply connected at the end of a distributing tap 11, of the non-softened water pipe 12.

Previously however, those plants had a drawback: the connection between softening tank 10 and service tap 11 was provided with a flexible rubber tube 14 and between said tube and tap 11 it is necessary to insert a three-way cock or tap, through which water coming from 11 was either sent through the softening device to come out at 15 or diverted through the three-way cock to be used without any softening.

Those three-way cock are of relatively costly manufacture and are not always tight. Moreover they cause movements of the rubber connection.

According to the invention, the three-way cock is done away with and replaced by a simple tap 16 directly fixed on the softening device 10.

The device shown figure 7 is connected to tap 11. Said device corresponds to the device shown figure 1, with the difference that the air slits or holes are formed in a circular chamber ending up in a nozzle 18.

In figure 7, the partition 5 is done away with according to a modified form. The converging or contracting pipe 17 opens out into a diverging or expanding pipe 19 which is connected to the flexible pipe 14, itself connected to tap 16.

Between the two pipes 17-19, there remains a free ring 13 in communication with the nozzle 18 to permit entrance of the air sucked in by the liquid column.

When the two tape 11 and 16 are open, the water flows through tank 10 where it arrives loaded with air. When tap 16 is shut, the water comes out at 18 in the non-softened state.

For the same application, the device of fig. 8 can be used, said device allowing as well to send aerated fluid to softening device 10 as to directly obtain aerated water when tap 16 is shut.

In the device shown fig. 8, in which the rubber connection 25 can be directly fixed to the end of tap 11, the feed water piping 26, opens out into chamber or space 27 which opens out, on the one hand, into nozzle 28 and which, on the other hand, is closed in respect of nozzle 29.

The first nozzle which is adapted to receive the flexible tube 14 is provided with a perforated partition 30 (which corresponds to the partition 5 of fig. 1) and with air entrance holes 31 which open out into nozzle 29.

This nozzle is of contracting-expanding form inside, with a ring of air entrance holes 32 at the junction of the two cones. The diverging or expanding portion of said nozzle is provided with dividing elements 33.

When the two taps 11 and 16 are open, the liquid tends to flow through the pipe of lesser resistance, i.e. pipe 14; as a result, a strong suction is realized at 29, the air flowing through holes 32 and from there through holes 31. If the tap 11 is open, the liquid comes out at 31 and 29, sucking in air through holes 32.

In the device shown figure 6, a very flexible rubber tube 34 can be provided at the nozzle 18, said tube being fixed to said nozzle, when for special reasons, it is not desirable that the fluid flowing through 10 should mix with air. Thanks to the vacuum at 18, resulting from the passage of fluid towards 14, said flexible tube closes itself automatically (see fig. 7).

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A device for intimately mixing at least two fluids, one of which circulates under pressure, comprising, in combination, a hollow cylindrical body connectable to a delivery pipe of fluid under pressure, a passage way in the wall of said body, connected to a space containing a fluid to be mixed to the fluid under pressure, and means down stream this passage, for obliging both fluids to mix together before leaving the hollow body, the cross-section aera of the body at the point where said passage is made, and the cross section aera of the body immediately down stream this passage, being both larger than the free streaming section for the fluid under pressure immediately up stream said passage.

2. A device according to claim 1, wherein said means comprises one or more baffles or perforated plates spaced apart.

3. A device according to claim 1 or 2, wherein said means is formed by an elongation of the body down stream the said passage.

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4. A device according to claim 1, characterised in that the stream of fluid under pressure is divided, immediately up stream the said passages for instance by a perforated cross wall.

5. For a device according to claim 1, a connector comprising a pasage-way through its wall, the part of this connector, up stream this passage way being adaptable to a delivery pipe of fluid under pressure, and the part of this connector down stream this passage way comprising a means for intimately mixing the fluid under pressure and the fluid aspirated by this fluid under pressure through said passage way, the cross-section aera of the connector at the point where the passage way is made, and the cross-section aera of the connector immediately down stream this passage, being both larger than the free streaming section for the fluid under pressure immediately up stream this passage.

6. A device according to claim 5, wherein the connector comprises a number of passage ways for fluids to be mixed with the fluid under pressure.

7. A device according to claim 3, wherein the passage way is connected to a duct.

8. A device according to claim 7, wherein the said duct is automatically closed by the depression caused by the fluid under pressure.

9. A device according to claim 7, wherein the said duct also comprises a passage way for a fluid to be mixed with the fluid under pressure, the parts of said duct up stream and down stream this passage way, having cross section aeras according to claim 1.

10. A device according to claims 7, 8 or 9, wherein the connector is connected through a tube and a tap with a tank.

Dated this 5th day of December 1935.

/s/ Hy. Fairbrother
Chartered Patent Agent,
30 & 32, Ludgate Hill, LONDON.

Note

Pages 239 and 240
are on Card 18.

"B"

(This part to be filled in at the Patent Office.)

Result of the search made under Sections 7 and 8 of the Patents Act, 1949, in connection with Application for Patent No. 468687.

Specifications or other publications cited as the result of the search made under Section 7

405316
360563
1170/15
16564/00
19654/93

Specifications cited as the result of the search made under Section 8

None

(Signatures)

NOTE.—Citations may be made during the examination of the specifications which are not relevant to the specification as accepted. Citations under Section 7 are completed before acceptance of the specification, but citations under Section 8 may be made subsequently.

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UNITED STATES PATENT OFFICE.

JOHN W. HYATT, OF NEWARK, NEW JERSEY.

ART OF PURIFYING WATER.

SPECIFICATION forming part of Letters Patent No. 326,221, dated September 15, 1885.

Application filed February 28, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HYATT, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in the Art of Purifying Water, of which the following is a specification.

The invention relates to the art of purifying water; and it consists, essentially, in a novel apparatus whereby air may be intimately combined with the water for the purpose of oxidizing its impurities according to well-known principles, and the water then directly passed into the service-pipes of a city or house, or first into a filter, whereby all flocculent matter is arrested, and then into said service-pipes. The passage of the combined air and water through the bed of filtering material enhances the effect of the air upon the water, since the particles of the bed will finely subdivide the air and then combine and intermingle the subdivisions and again divide the air during its further passage through the filter. It is well understood that when air and water are intimately combined there will be a chemical action, the water absorbing the oxygen of the air and the impurities in the water being consumed or rendered inert. In this condition the materials remaining after the chemical action, while probably not injurious until further decomposition has taken place, are, to say the least, offensive to the eye. Whether or not the water and air will be brought into such intimate relation as to insure the chemical purification of the water thereby will depend upon the nature of the apparatus employed for effecting this purpose; and it is to be remarked that in the purification of water for large cities or for manufacturing districts it is essential that the apparatus be simple in construction and be capable of utilization without great expense as to the original construction as well as to its maintenance. The object of the present invention is, therefore, to produce an apparatus whereby, in a continuous process, water may be rendered chemically pure by its union with air and the inert material remaining in the water be removed, the apparatus being simple in construction and uniform and effective in its operation, and maintainable at a minimum expense.

The invention will be fully described in the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical longitudinal section of an apparatus embodying that part of my invention which relates to the union of the water and air. Fig. 2 is an enlarged vertical section of the upper end of the pipe A, illustrating the manner of subdividing the water and utilizing the subdivisions for conveying air into the tubes. Fig. 3 is a central vertical longitudinal section of the apparatus, illustrated as being in connection with an elevated reservoir and discharging into a filter, whereby the impurities in the water which have been rendered inert are arrested prior to the delivery of the water into the service-pipes of the city; and Figs. 4 and 5 are central vertical longitudinal sections of slightly-modified forms of the apparatus involving the invention sought to be protected hereby.

In the accompanying drawings, A designates the pipe or receptacle in which the water and air are combined. It consists of the branches lettered B and C, respectively, connected by a short bend, the upper end of both branches being open, and the mouth of the branch lettered B being elevated above the horizontal plane of the upper end of the branch lettered C. The pipe or receptacle A will contain suitable devices for thoroughly commingling the air and water, the pressure of the air being one atmosphere at the inlet and an increased number of atmospheres at the point of connection of the branches B C, at the upper end of the latter of which the unabsorbed air is discharged at a pressure of one atmosphere.

The devices arranged within the pipe or receptacle A for effecting the chemical union of the air and water may vary in their construction to a considerable extent, the main purpose being to keep the water in a constant state of agitation in connection with the air, and to prevent the escape of the latter until its desired union with the water has been effected. There are some features of special advantage in the construction I illustrate in the drawings for effecting the union of the air and water independent of the general novel features of the apparatus as a whole.

In the upper end of the branch B of the pipe or receptacle A, I illustrate an arrangement of devices in which I utilize in part the principle of the well-known Sprengel air-pump, and by means of which the stream of water supplied through the pipe D, leading from the pump E, is subdivided, and the subdivisions caused to pass through and draw air into tubes, in which there will be a partial union of the air and water prior to their discharge into the lower parts of the receptacle or pipe A, where there will be a further chemical union, owing to the constant agitation of the water and air during the passage of the former to the receiving tank or reservoir F. The water supplied by the pipe D is discharged upon the conical screen G, whereby it is subdivided or articulated, and passes into the series of tubes or Sprengel air-pumps H, arranged directly below the screen G, each of said tubes or pumps having a conically-shaped inlet, I, as illustrated more clearly in the enlarged sectional view denominated Fig. 2.

Below the tubes H (see Fig. 1) is arranged upon a grating, J, a bed of gravel, broken stone, or cobble-stones, K, and below this bed of stone is provided a series of screens, L, beyond which the sides of the pipe or receptacle A are furnished with a series of deflecting-plates, M.

While I have illustrated in the pipe A a bed of stone, K, screens L, and deflecting-plates M, it is not to be understood that all of these devices are to be used simultaneously, although they may be so employed, if desired.

I have the stone, screens, and blades M as illustrating the varied means which may be employed to keep the water in a constant state of agitation, so as to effectually accomplish the union of the air and water. It will be found entirely practicable to employ the bed of gravel or stone K, extending throughout the greater portion of the receptacle A or the screens L, the plates M being omitted. I have used the screens L (as well as the bed of stone) in this manner with entirely satisfactory results, and the apparatus thus constructed has the further advantages of being simple and inexpensive. The water passing into the tubes or pumps H will draw the air with it, as aforesaid, and the air and water passing through and around the stones K will be thoroughly intermingled and combined, and the pressure of the air will increase as the water descends to the lower level of the pipe or receptacle A, so that while the air enters the branch B at a pressure of one atmosphere it will increase as the water and air are forced along through the pipe toward the connection N, leading into the reservoir F, the air finally escaping at the upper end of the branch C at a pressure of one atmosphere.

The water may be led from the tank F for use by means of the delivery-pipe P, having a gate-valve, Q, or if it is desired to remove the flocculent inert substance also from the water the pipe P should lead to a filter, R, of any suitable construction, as shown in Fig. 3, in which S denotes a bed of granular filtering material and T a delivery-pipe. It is certainly desirable, and in many instances necessary, to remove the inert material, especially when the water is to be employed for manufacturing and domestic purposes. It is to be observed that the process is continuous from the pipe D to the delivery-pipe T, from which the water passes in a purified condition.

The pump E will not be necessary, of course, where the source of supply is from an elevated reservoir, either natural or artificial, as shown in Fig. 3, wherein V designates the supply for unfiltered and unaerated water. In Fig. 3 I have shown also the tube H as extending almost throughout the pipe or receptacle A, since this construction will serve to effectually combine the air with the subdivided streams of water, the air being drawn into the tubes H by and carried along with the water.

In the apparatus illustrated in Fig. 4 I utilize the screens L exclusively for subdividing and commingling the air and water, and omit one branch of the receptacle A. This form of apparatus may be connected directly with the filter, as illustrated in said Fig 4. It is not necessary in all cases to use a receptacle, A, consisting of two branches, since the only purpose of the receptacle is to receive the air and water, and to thoroughly combine and intermingle them so that the chemical action may be as complete as possible.

Fig. 5 shows another modification of my filter, the receptacle A having a closed top, and provided with the screens L and deflecting-plates M. In the top fits one end of the supply-pipe D, which is preferably about one-half of the diameter of the receptacle A. One side of this receptacle A is provided with a small pipe, W, the outer end thereof being closed, and provided on its under side with a valve, X, opening upwardly within the pipe. As the water flows down through the receptacle, taking the air with it, a partial vacuum is created in the pipe W, and the valve X formed therein allows the air to pass up through it to be commingled with the flowing water.

I am aware that in the art of filtration air has been combined with the water for the purpose of aerating it. An apparatus for accomplishing this result is illustrated in Letters Patent No. 229,774, granted to Daniel C. Otis on the 6th day of July, 1880, now owned by my assignee. Other patents on filtering apparatus have been issued in which means have been devised for aerating the liquid.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An apparatus for purifying water, consisting, essentially, of a receptacle constructed substantially as described, and a supply-pipe leading therein, a filter separated from but in communication with said receptacle, and

Note

Page 242 is blank;
Page 243 is on Card 18;
Page 244 is blank;
Page 245 is on Card 18;
Page 246 is blank;
Page 247 is on Card 18;
Page 248 is blank.

adapted to receive the water after passing through the latter, and agitators located within the receptacle, for agitating and commingling the air and water before passing from the receptacle, and prior to its entrance into the filter, substantially as set forth.

2. In an apparatus for purifying water by aeration, a receptacle having at its open upper end a screen for articulating the stream of unpurified water, and a series of Sprengel air-pumps below said screen to receive the articulated divisions of the stream, in combination with a water-supply, substantially as set forth.

3. In an apparatus for purifying water by aeration, the combination, with a water-supply, of a receptacle open at its upper end to admit air, a series of Sprengel air-pumps located within the receptacle below the inlet for air and water, agitators below said pumps for keeping in agitation, and thus facilitating the union of the air and water, and an outlet from the receptacle, substantially as set forth.

4. In an apparatus for purifying water by aeration, the combination, with a receptacle open at its upper end to admit air, of a supply-pipe leading therein, a series of Sprengel air-pumps located within the receptacle and below the air and water supply, and a screen or its equivalent below the pumps, substantially as and for the purposes set forth.

5. In an apparatus for purifying water, the combination, with a receptacle, an air-supply and a supply-pipe for water at its upper end, of a series of Sprengel air-pumps located within the receptacle below the air and water supply, agitators for disturbing the flow of the water and air below said pumps, and a filter in communication with said receptacle, substantially as set forth.

6. In an apparatus for purifying water by aeration, the combination, with the receptacle A, open to admit air, of a series of Sprengel air-pumps, H, located therein, and having inverted-cone-shaped mouths I, and a water-supply above said pumps, substantially as set forth.

7. In an apparatus for purifying water by aeration, the combination of a water-supply with a receptacle, A, open at its receiving end to admit air, and composed of branches B C, a screen, G, for articulating the inflowing current of water, a series of Sprengel air-pumps, H, below said screen, a bed of broken stone or gravel below said pumps, and a delivery, substantially as set forth.

8. An apparatus for purifying water, consisting of the receptacle A, composed of branches B C, the former being taller than the latter, and both having their upper ends open, a water-supply leading to the receptacle, and screens within the receptacle for subdividing the water and air, thus facilitating their union, and a filter removed from but in communication with said receptacle, substantially as set forth.

9. In an apparatus for purifying water, the receptacle A, composed of the branches B C, the former, being open to admit air, taller than the latter and containing the articulating, screen G, and Sprengel air-pumps H, in combination with the supply-pipe D, a filter containing a bed of filtering material, and a connection between the filter and branch C, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 29th day of January, A. D. 1885.

JOHN W. HYATT.

Witnesses:
GEORGE COOK,
HERMAN GUSTOW.

Defendant's Exhibit 44-2 2 Apps 255

UNITED STATES PATENT OFFICE.

ROBERT G. FERGUSON, OF LAKEWOOD, NEW JERSEY, ASSIGNOR OF ONE-HALF TO ABRAHAM M. ELKUS, OF NEW YORK, N. Y.

APPARATUS FOR MIXING LIQUIDS AND GASES.

SPECIFICATION forming part of Letters Patent No. 591,830, dated October 19, 1897.

Application filed January 22, 1897. Serial No. 620,229. (No model.)

To all whom it may concern:

Be it known that I, ROBERT G. FERGUSON, a citizen of the United States, and a resident of Lakewood, in the county of Ocean and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Mixing Liquids with Gases, of which the following is a specification.

This invention relates to an apparatus so constructed that it will charge liquids with gases in such a manner that the latter will be finely subdivided and will be suspended in the liquid in the form of small bubbles, that will be slow to escape.

The invention is well adapted to be applied for the production of effervescent or "Nauheim" baths in which a saline liquid is charged with carbonic-acid gas, but it is clear that the invention may be applied to other purposes.

In the accompanying drawings, Figure 1 is a longitudinal section, partly in side view, of my improved apparatus, showing it applied to a bath. Fig. 2 is a detail longitudinal section through the injector; and Fig. 3, a cross-section on line 3 3, Fig. 2.

The letter *a* represents a fixed or portable vessel designed for the reception of a suitable liquid, such as water. The vessel *a* may communicate with the water-main by a pipe *a'*, having valve a^2, and extending to within a short distance of the bottom of the vessel. Suitable chemicals, such as salts, may be introduced into the vessel *a*, through a hand-hole a^3, which will be thoroughly dissolved by the water admitted by pipe *a'*. Near its upper end the vessel *a* communicates by pipe *b* with a valve-chamber *c*, which in turn communicates with the outer tube *d* of an injector or mixer. A valve *c'*, in chamber *c*, is adapted to control or check the flow of liquid.

Through the outer or liquid tube *d* there extends centrally the inner or gas tube *e*, which is connected with a gas-cylinder *f* by a flexible hose *f'*. The lower end of tube *e* terminates in a conical head or valve *e'*, adapted to engage a conical valve-seat *d'*, in which the tube *d* terminates. The tube *e* is longitudinally adjustable, so as to increase or diminish the size of the liquid-passage formed between the parts *d' e'*, and to thus regulate easily the relative proportions of admixed liquid and gas.

To permit the vertical adjustment of tube *e*, I have shown it connected to a hand-lever *g*, fulcrumed to a fixed support *g'*, while a stuffing-box d^2 holds the tube at any elevation at which it may be set.

To the lower end of tube *d* there is attached a foraminated thimble *h*, through the small perforations of which the admixed gas and liquid are ejected in the form of a fine spray. This spray is collected in a chamber formed by a surrounding tube *h'*, and thence flows downward through a number of parallel upright ducts or channels *i'* of a perforated nozzle *i*, to be finally discharged into a bath-tub A or other receptacle through nipple i^2.

By the particular construction of the injector the gas is divided into small bubbles, which will be slow to rise through the saturated body of liquid within tub A, so that an effervescent bath is obtained which permits a prolonged use without loss of the original properties of the admixture. The injector furthermore so breaks the force of the current that the charged liquid will escape into the tub through the nipple in a quiet stream, and not in the form of a violent current. Finally the apparatus enables a constant or unceasing renewal of the admixture in its full strength for any desired period of time.

It is clear that the invention may be applied to different purposes from the one specified, it being adapted generally for the admixture of volatile, semivolatile, or gaseous substances or of solid or semisolid substances (under pressure) with liquids.

What I claim is—

1. In a mixing apparatus the combination of an outer tube with an inner tube, a perforated thimble at the bottom of the outer tube, a surrounding chamber, and a nozzle having a series of ducts and arranged beneath said chamber, substantially as specified.

2. In a mixing apparatus the combination of an outer tube having a valve-seat with an inner longitudinally-adjustable tube having a head adapted to engage said valve-seat, means for operating the inner tube, a perforated thimble at the bottom of the outer tube,

a surrounding chamber, and a nozzle having a series of ducts and arranged beneath said chamber, substantially as specified.

3. In a mixing apparatus the combination of a vessel with a liquid-feed pipe extending into the same to within a short distance of its bottom, an outer tube having a valve-seat and connected to said vessel, a valve between vessel and tube, a gas-cylinder, a longitudinally-movable headed inner tube connected thereto, means for operating the inner tube, a perforated thimble at the bottom of the outer tube, a surrounding chamber, and a nozzle having a series of ducts and arranged beneath said chamber, substantially as specified.

Signed at Lakewood, in the county of Ocean and State of New Jersey, this 19th day of January, A. D. 1897.

ROBERT G. FERGUSON.

Witnesses:
BENJ. H. FIELDER, Jr.,
F. W. TODD.

Defendant's Exhibit 44-3

UNITED STATES PATENT OFFICE.

CHARLES A. CLAFLIN, OF MEDFORD, MASSACHUSETTS.

AIR-EXHAUSTING LIQUID-SUPPLY APPARATUS.

No. 691,848. Specification of Letters Patent. Patented March 10, 1902.

Application filed October 9, 1897. Serial No. 655,055.

To all whom it may concern:

Be it known that I, CHARLES A. CLAFLIN, of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Air-Exhausting Liquid-Supply Apparatus, of which the following is a specification.

This invention has for its object to enable a liquid supplying faucet to perform the additional function of exhausting air from a vacuum chamber or element of an apparatus for utilizing a vacuum or partial vacuum.

The invention is embodied in a cock or faucet having a liquid inlet and outlet, an intermediate air inlet, means for causing the flow of liquid through the casing to induce an inflow of air through the air inlet, means for controlling the flow of liquid through the casing and means for automatically closing the air inlet when the flow of liquid and the flow of air induced thereby cease, so that the partial vacuum produced by the operation of the faucet in a vacuum tank with which the air inlet is connected, may be maintained. When the faucet is performing its ordinary function of supplying liquid, a flow of air into the casing is induced by the flow of liquid therethrough, the air and liquid passing together from the outlet of the casing.

The invention is also embodied in an apparatus which includes a plurality of faucets of the character above mentioned, and means connected with the air inlets of the several faucets for utilizing the vacuum caused by the action of the faucets or either of them.

The faucets may be the several water supply faucets used in a house, and the vacuum utilizing means may include a vacuum tank suitably connected with a steam heating system to maintain heat in the radiators of the heating system. By thus utilizing water supply faucets, such as those used in connection with kitchen sinks, lavatories, flushing tanks, etc., the employment of separate and special vacuum producing means or apparatus in connection with a steam heating system, is rendered unnecessary, it being possible to produce by a system of said faucets in a building and by the ordinary flow of water through such faucets, a vacuum as high as 20", and of greater or less volume according to the water pressure and the quantity of water drawn in a given time.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a sectional view of one form of air exhausting faucet embodying my invention. Fig. 2 represents a section on line 2—2 of Fig. 1. Fig. 3 represents a sectional view of a form of faucet embodying my invention, suitable for use as a so-called ball cock, in connection with a water closet flushing tank. Fig. 4 represents a section on line 4—4 of Fig. 3. Fig. 5 represents a sectional view of another type of faucet embodying my invention. Fig. 6 represents in elevation an air exhausting liquid supply apparatus, which includes a plurality of the said faucets and a vacuum tank connected therewith and with a steam heating system.

The same letters of reference indicate the same parts in all the figures.

For convenience I will use the term "faucet" as characterizing each form of liquid controlling device shown in the drawings, whether the same be for the supply of water at a kitchen sink, wash bowl, etc., as shown in Figs. 1 and 2, or for supplying a flushing tank, as shown in Figs. 3 and 4, or for controlling the flow of liquid through a conduit, as shown in Fig. 5.

Referring first to Figs. 1 and 2, 12 represents a casing having a liquid inlet 13, an outlet 14, and an air inlet 15 located between the inlet 13 and outlet 14. The casing is provided between the liquid inlet and the outlet with means for causing the flow of liquid through the casing to induce an inflow of air through the air inlet 15, the air mingling with the liquid, and flowing therewith through the outlet 14. The said means in the best embodiment of my invention of which I am at present aware, comprise a jet-forming nozzle 16 communicating with the inlet 13 through branched passages 17, and a combining nozzle 18 separated from the jet-forming nozzle 16 by an air space 19 which communicates with the air inlet 15. The nozzles 16 and 18 are tapered, as shown in Fig. 1, and each is preferably detachably secured to the faucet casing 12 by a screw-thread connection, so that the nozzles may be removed whenever this is desirable. The relative arrangement of the nozzles 16 and 18 and air chamber 19 is such that a jet of water formed by the nozzle 16, is projected across the air chamber into the combining nozzle, and induces a flow of air through the inlet

Defendant's Exhibit 44-3

15 into the air chamber 19, the air mingling with the jet of water in the combining nozzle, and passing out with the water through the outlet 14. The valve 21 which controls the flow of liquid through the faucet, is adapted to close upon a seat 22, which is located between the liquid inlet 13 and jet-forming nozzle 16, so that when the valve is closed, the flow of liquid through the nozzle 16 ceases.

It will be seen that whenever the faucet is performing its ordinary function, an inflow of air is induced through the air inlet 15, this inflow ceasing when the faucet is closed. In Figs. 3 and 4 I show a faucet of the character ordinarily known as a ball cock, the valve of the faucet being opened and closed by the downward and upward movements of a float lever 23 in a flushing tank 24, such as is commonly used in water closets. In this embodiment of the invention, 25 is the casing of the faucet, 26 is the jet-forming nozzle, 27 is the combining nozzle, 28 is the air chamber between the nozzles 26 and 27, and 29 is the air inlet communicating with the air chamber 28. The valve 30 which controls the flow of liquid through the faucet, is mounted on a plunger 31 connected with the float lever 23 in the usual or any suitable manner. When the valve is opened the flow of liquid through the faucet into the flushing tank, induces a flow of air through the inlet 29.

In Fig. 5 I show a faucet adapted to serve as a shut-off in a water pipe or conduit, and having a casing 32 containing a jet-forming nozzle 33 and a combining nozzle 34, said casing having a liquid inlet 35, an air inlet 36 and a shut-off valve 37 between the liquid inlet and the jet-forming nozzle. The operation of this type of faucet is the same as that of the others.

In Fig. 6 I show a system which includes the two faucets shown in Figs. 1 and 3, a vacuum chamber 38 which is connected by a pipe 39 with the air inlets 15 and 29 of said faucets, radiators 40 having suitable pipe connections with the vacuum chamber, said radiators forming part of a steam heating system, which includes a boiler 41 and suitable steam conducting pipes connecting the boiler with the radiators. The vacuum tank 38 may be suitably connected with the radiators, the steam piping and the boiler. Suitable check valves 42 are employed to prevent a back flow of air to the vacuum chamber when the faucets are not in operation.

The vacuum faucets may, if desired, be connected directly to the radiators, suitable check valves and thermostatic valves being employed between the faucets and the radiators to prevent air from returning to the radiators after having been withdrawn therefrom by the action of the faucets, and also to prevent steam from flowing through the air pipes to the faucets after steam generation and circulation have commenced.

The air inlet 15 in each embodiment of my invention, constitutes a part of a conduit adapted to be connected with a vacuum chamber (which may be a steam radiator), the operation of the faucet inducing a flow of air from said chamber. The said conduit in each case is provided with means such as a check valve 42, whereby it may be closed to prevent a back flow of air to said chamber when the operation of the faucet ceases.

It will be understood that the amount of vacuum produced is dependent on the number of faucets employed and the extent to which the faucets are used.

It will be seen that the faucets may be used only for the supply of liquid when a vacuum production is not desired.

My invention above described may be utilized for other purposes, and is not limited to use in connection with a heating system.

I claim:

1. An air-exhausting apparatus, comprising a faucet or cock casing having a liquid inlet, an outlet, an intermediate air inlet, means for causing the flow of liquid through said casing to induce an inflow of air through the air inlet, and a liquid-controlling valve adapted to shut off the liquid between the liquid inlet and the air inlet, the said air inlet forming a part of an air conduit adapted for connection with a vacuum chamber, and means for closing said conduit to prevent a back flow of air therethrough.

2. An air-exhausting apparatus, comprising a faucet or cock casing having a liquid inlet, an outlet, an intermediate air inlet, means for causing the flow of liquid through said casing to induce an inflow of air through the air inlet, and a liquid-controlling valve adapted to shut off the liquid between the liquid inlet and the air inlet, the said air inlet forming a part of an air conduit adapted for connection with a vacuum chamber, and a vacuum-maintaining check valve controlling the air in said conduit.

3. An air-exhausting faucet or cock, comprising a casing having a liquid inlet, an outlet, a jet-forming nozzle communicating with the liquid inlet, a combining nozzle between the outlet and the jet-forming nozzle, and separated from the latter by an air space, an air inlet communicating with said air space, and a liquid-controlling valve between the jet-forming nozzle and the liquid inlet, the relative arrangement of said nozzles and air space being such that a jet of liquid is projected across the air space into the combining nozzle, and induces an inflow of air through the air inlet.

4. An air-exhausting liquid-supply apparatus, comprising a plurality of faucets, each having a liquid inlet, an outlet, an intermediate air inlet, means for causing the

flow of liquid through the casing to induce an inflow of air through the air inlet, and means for shutting off the liquid between the liquid and air inlets, a vacuum tank, pipe connections between said tank and the several faucets, and vacuum-maintaining check valves controlling said air inlets.

In testimony whereof I have affixed my signature, in presence of two witnesses.

CHARLES A. CLAFLIN.

Witnesses:
EDWARD E. PARKER,
ORLANDO F. DE SHON.

Note

Page 252 is blank;
Page 253 is on Card 18;
Page 254 is blank.

Note

Page 857 is on Card 18;
Page 858 is blank;
Page 859 is on Card 20;
Page 860 is blank.

Note

Page 264 is blank;
Page 265 is on Card 20;
Page 266 is blank;
Page 267 is on Card 20;
Page 268 is blank.

Defendant's Exhibit 44-4

UNITED STATES PATENT OFFICE.

NELSON A. LOCKWOOD, OF OGDEN, UTAH.

APPARATUS FOR THE GASEOUS TREATMENT OF SACCHARINE JUICES.

1,195,044. Specification of Letters Patent. Patented Aug. 15, 1916.

Application filed February 9, 1916. Serial No. 77,934.

To all whom it may concern:

Be it known that I, NELSON A. LOCKWOOD, a citizen of the United States, residing at Ogden, in the county of Weber and State of Utah, have invented certain new and useful Improvements in Apparatus for the Gaseous Treatment of Saccharine Juices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in apparatus for the gaseous treatment of saccharine juices.

I am aware that, in the manufacture of cane sugar, in addition to treating the expressed raw cane juice with lime for defecation purposes, for a long time it has been customary to sulfur the raw juice, by impregnating the same with sulfur dioxid, for the purpose of decolorizing or bleaching the juice. Similarly, in the treatment of the raw diffusion juice from the sugar beet, in addition to the introduction of carbon dioxid, for the purpose of carbonation or causing the precipitation of the lime salts, employed to remove impurities, it has also been a common practice to sulfur the solution.

My invention, therefore, does not aim at the broad idea of treating saccharine juices with any particular gas or gases, but is directed to an improved apparatus for making that treatment more positive and effective.

The main principle on which prior devices of this character have operated has been to have the raw juice sprayed or caused to flow downwardly, in thin sheets or ribbon-like streams, over alternately disposed shelves, oppositely located in a closed receptacle, commonly known as sulfur boxes, while the gases were caused to flow upwardly therethrough and were partially absorbed by the down-coming juice. This, however, produced more of a bodily contact of the gases with the surface of the juice, and while absorption resulted, it is obvious that the more intimately the treating gas or gases are caused to commingle with the juice, the more effective will be the impregnation and absorption.

The primary object of my invention, therefore, is to improve the conditions or methods heretofore employed, by causing the gases to come into more direct or intimate molecular contact with the particles of the mass of juice, rather than by surface contact and indirect partial absorption.

In the accomplishment of this end, my invention consists broadly in injecting the raw juice, preferably under a pumping pressure, in the form of spray or jets, into the apparatus, and simultaneously sucking in the treating gas or gases into intermingled or entrained relation therewith, by aspiratory action of the injecting means, at the entrance of the apparatus, causing an initial commingling of the juice and the gases. The juice and entrained gases are then conducted through a down-pipe or conduit of suitable length, to a retarding chamber, having a series of alternating, oppositely disposed baffle plates or barriers, forming a tortuous passageway through the retarding chamber, and diminishing the velocity of the ascending liquid, as it rises in the retarder toward a discharge outlet at the upper end thereof. The gases naturally act on the juice during the passage through the down-pipe, and further react on the liquid in the retarder, resulting in more effective clarification and bleaching.

The methods of filtering out the remaining impurities from the clear juice, evaporation, crystallization, etc., may obviously be accomplished by the usual apparatus now employed for such purposes.

From a manufactural standpoint, another object of the invention is to produce such an apparatus, which is not only simple in construction and operation, but which is also durable, efficient in action, and comparatively inexpensive to manufacture.

For the purpose of a full disclosure, reference is had to the accompanying drawings illustrating a practical embodiment of the invention, which will be described in detail in the following specification, and the particular features of novelty of which will be more particularly pointed out in the appended claims.

Referring to the drawings, in which like characters designate the same parts in the several views:—Figure 1, is a vertical sectional view through the outer receiving tank, my improved apparatus being shown in elevation, and a portion of the receiving tank, and the down-pipe conduit being partially broken away. Fig. 2, is a longitudinal sectional view of the upper portion of my apparatus, showing the disposition of the in-

jector nozzle and cones, within the gas receiving casing or commingling chamber. Fig. 3, is a similar view of the lower portion of my apparatus, showing the disposition of the baffling plates or barriers within the retarding tank, and the outer receiving tank being omitted, and Fig. 4, is a transverse sectional view through the injector nozzle, taken on the line 4 of Fig. 2, and looking downwardly in the direction of the arrow.

1 designates a cylindrical casing, functioning as a mixing chamber, having a flanged open bottom 2 and top 3, the upper end of the casing being provided with inlets for the treating gases, the inlet for the sulfurous acid gas (SO_2) being indicated at 4, and the inlet for the carbonic acid gas (CO_2) being indicated at 5.

The casing 1 is provided with a flanged plate or head 6, snugly seated within the aperture 3 of the casing, its flanged rim portion 7 resting on top of the casing and securely bolted thereto to form a tight top closure for the mixing chamber. The central portion of the cover 6 is also apertured as at 8, and may be provided with the circular boss 9, on which is seated the flanged top 10 of an aspirator or injector 11, projecting through the aperture 8, into the mixing chamber, and which injector may have an integral bottom plate 12, provided with a plurality of jet orifices or nozzles 13, preferably of conical contour, and so disposed around the bottom plate 12 as to project the incoming raw juice, in the form of a spray or a series of jets, against the inner surface wall of the first hollow conical member hereinafter referred to.

Seated on the flange 10 of the injector is the flange 14 of the raw juice inlet pipe 15, leading from the source of raw juice supply (not shown) and registering with the hollow interior of the injector. The boss 9 and flanged heads 10 and 14 may be suitably bolted together.

Centrally within the mixing chamber are suitably supported an alined series of truncated hollow conical deflectors 17, 20 and 23, three being shown in the drawings. These conical deflectors may have flaring upper rims 18, 21 and 24, and cylindrical short extensions 19, 22 and 25 at their lower ends, but it is obvious that they may merely be simple cones. The upper portion of the cone 17, preferably projects substantially in line with the gas inlets 4 and 5, and the nozzle end of the injector projects a short distance within the cone 17. The lower or apex end 19 of the upper cone similarly projects within the upper portion of the intermediate cone 20, while the apex end of the cone 20 projects within the flaring upper portion of the lower cone 23, the apex ends of the cones having successively greater diameters than the preceding one. The lower end of the cone 23 also projects into a similarly disposed conical throat 26, flanged at 27 and securely bolted to the base flange of the casing 1. This conical throat 26 is also provided with a flanged apex 28 bolted to the flanged apex end of an inverted conical tube 29, terminating in one or more tubular sections 30 and 31, which latter are connected by an elbow 32 with the interior lower portion of a retarder or baffling tank 33, the arrangement forming a conduit, for the intermingled raw juice and gases, between the injector and the retarder.

The retarder may be of sectional construction and suitable contour, rectangular, or circular as shown and extends a substantial distance upwardly alongside the down-pipe or conduit sections 31 and 30, which it supports by its connection at the base with the elbow 32, and its upper end by the connecting rib 34. The retarder or baffle tank, itself, may be suspended within an outer receiving tank, for the clarified liquid, by the cross-channel bars 36, supported by the receiving tank 35, on which channel bars the lugs 37 of the retarder rest.

The interior of the retarder has a series of baffling plates or barriers 38 and 39, alternately projecting inwardly, in opposite directions, and extending substantially beyond the center of the tank, in overlapped relation, forming an interrupted tortuous passageway for retarding the flow of the ascending gaseous impregnated liquid. The lowermost baffle 38 is located just above the inlet elbow 32, and is disposed toward the opposite side of the tank, and the uppermost baffle 39 is oppositely arranged and is located just below the liquid outlet 40, which latter discharges into the outer or receiving tank 35, from whence the clarified liquid may be conducted to storage tanks and utilized at will for filtration, evaporation, crystallization, and centrifugal treatment.

41 designates a pipe leading into the top portion of the retarder, and provided at its outer end with a faucet 42, for sampling purposes.

43 designates a rotary plug drainage cock for the tank 33, connected by a spindle or rod 44, extending through and above the tank 35, with an operating lever or hand wheel 45, and 46 designates a plug closed drainage outlet at the bottom of the tank 33.

The cock 43 may be employed for drawing off the more or less settled, clarified liquor, remaining in the retarding tank 33, after operations have ceased, and the lower plug closed drainage outlet 46 may be employed for drawing off the liquor in the bottom of the tank, and which liquor in the bottom of the tank may contain more or less sediment. Or these drainage cocks may be utilized in the operation of washing out the retarder tank.

As a matter of fact my device might be used independently as a carbonating or as a sulfurizing apparatus, in which case the juice would have to be run twice through the apparatus; but used conjointly for simultaneously carbonating and sulfurizing, the carbonic acid gas (CO_2) is introduced through the inlet 5, from a suitable source, and the sulfurous acid gas (SO_2) is introduced through the inlet 4, from the generator for the sulfur fumes, but as these sources of supply may be of common origin, they have been omitted from the drawings as unnecessary, not being a specific part of the invention itself. Also the raw juice may be led from tanks, or directly from the crushers in the case of cane juice, or from the diffusion vats in the case of beet juice. In practice, I preferably pump the raw juice through the inlet pipe 15, under an approximate pressure of forty pounds, from whence it is delivered to the injector nozzle 11, and through the orifices 13 in jets or sprays, leaving a hollow or open central zone, encompassed by the jets, providing a larger surface area for the initial contact of the treating gas or gases drawn in by the suctional or inductive action of the incoming juice. These jets may be directed to impinge against the inner conical wall of the first conical deflector, causing a splashing or diverting effect for more thoroughly mixing or commingling the particles of juice and treating gases, the gases sucked into the chamber 1 being also more positively drawn into and through the successive cones, in entrained relation with the juice, by the suction created by the juice itself passing therethrough. So also the juice successively passes through the intermediate and lower cones, the upper or base end of the inverted cones being open to allow of the entrance of the gases from the chamber 1 to more thoroughly permeate the juice with the treating gases during the initial stage of operation.

As the partially permeated juice passes into the conical throat 26, gases from the bottom of the chamber 1 are also drawn into the throat through the opening 2, and in passing through the throat 26 there is a more or less tendency toward a contraction or compression of the mixed juice and gas during passage, as it passes through the restricted necks or apex ends of the throat and the inverted conical tube section 29, in which latter there is an after tendency toward gradual expansion as the mixture passes therethrough to the cylindrical tube sections below.

Thus the juice and gases are quite thoroughly combined initially, the entrained gases further acting on the juice as they pass in commingled relation, in the same direction of flow, to the retarder, wherein it is apparent that the mixture is more or less compressed and retarded in its tortuous passage around the baffles, causing in reaction a more intimate impregnation of the juice in its obstructed ascent to the discharge outlet.

Although I have described the invention in detail as illustrated, it will be understood that obvious minor changes might be made in the structural manufacture of the various elements without departing from the spirit of the invention, and without vitiating any of the principles thereof, and—

Having thus made a full disclosure of my improved apparatus and the operation of the same, what I claim is:—

1. In apparatus for treating saccharine juices, including a receiving receptacle having a suitable outlet and provided with an inlet for a treating gas, in combination with a juice injector, projecting within said receptacle and having a nozzle discharge so formed as to direct the injected juice within said receptacle in the form of a wall of juice having an open central zone, substantially as described.

2. In apparatus for treating saccharine juices, including a receiving receptacle having a suitable outlet and provided with an inlet for a treating gas, in combination with a juice injector, projecting within said receptacle and provided with a nozzle end having a plurality of jet orifices, functioning substantially as described.

3. In apparatus for treating saccharine juices, including a receiving receptacle having a suitable outlet and provided with an inlet for a treating gas, in combination with a juice injector, projecting within said receptacle and provided with a nozzle end having a plurality of tapering jet orifices functioning substantially as described.

4. In apparatus for treating saccharine juices, including a receiving receptacle having a suitable outlet and provided with an inlet for a treating gas, in combination with a juice injector, projecting within said receptacle and provided with a nozzle end having a plurality of circularly disposed jet orifices, for directing the injected juice into said receptacle in the form of a wall of jets having a central open zone, substantially as described.

5. In apparatus for treating saccharine juices, including a closed receptacle, forming a gas chamber, provided with an inlet for a treating gas, in combination with means for receiving and conveying the incoming juice and treating gas through and from said receptacle, including as an element a hollow truncated inverted cone, suitably mounted in said receptacle, and a juice injector directly discharging into said hollow cone, substantially as described.

6. In apparatus for treating saccharine

juices, including a closed receptacle, forming a gas chamber, provided with an inlet for a treating gas, in combination with means for receiving and conveying the incoming juice and treating gas through and from said receptacle, including as an element a hollow member, preferably in the form of a truncated inverted cone, suitably mounted in said receptacle adjacent said gas inlet, and a juice injector directly discharging into said hollow member, in inductive relation to said gas inlet, and functioning in the dual capacity of a juice inlet and as an aspirator for drawing said treating gas into said receptacle by the suctional force of the incoming juice itself, substantially as described.

7. In apparatus for treating saccharine juices, including a closed receptacle, forming a gas chamber, provided with an inlet for a treating gas, in combination with means for receiving and conveying the incoming juice and treating gas through and from said receptacle, including as an element a hollow member, preferably in the form of a truncated inverted cone, suitably mounted in said receptacle adjacent said gas inlet, and a juice injector directly discharging into said hollow member, in inductive relation with said gas inlet said functioning substantially as set forth, and said juice injector being provided with a nozzle end having a discharge so formed as to direct the injected juice within said hollow member in the form of a wall of juice having an open central zone, substantially as described.

8. In apparatus for treating saccharine juices, including a closed receptacle, forming a gas chamber, provided with an inlet for a treating gas, in combination with means for receiving and conveying the incoming juice and treating gas through and from said receptacle, including as an element a hollow member, preferably in the form of a truncated inverted cone, suitably mounted in said receptacle adjacent said gas inlet, and a juice injector directly discharging into said hollow member, in inductive relation with said gas inlet and functioning substantially as set forth, and said juice injector being provided with a nozzle end having a plurality of jet orifices, substantially as described.

9. In apparatus for treating saccharine juices, including a closed receptacle, forming a gas chamber, provided with an inlet for a treating gas, in combination with means for receiving and conveying the incoming juice through and from said receptacle, including as element a hollow member, preferably in the form of a truncated inverted cone, suitably mounted in said receptacle adjacent said gas inlet, and a similarly disposed hollow element, communicating with and closing the bottom of said receptacle and receiving the discharge from said internal hollow member, and an outlet conduit leading from said external hollow member, and a juice injector discharging into said internal member and constructed and functioning substantially as described.

10. In apparatus for treating saccharine juices, including a receptacle adapted to initially receive the juice to be treated and a suitable treating gas, and provided with an outlet conduit of substantial length to permit of the action of said gas on said juice during their passage therethrough, in combination with means at the other end of said outlet conduit, operating to cause the juice to flow with a less accelerated motion to positively retard the final delivery of the juice and treating gas and enabling the gas in its reaction on said juice to be more thoroughly absorbed thereby, substantially as described.

11. In apparatus for treating saccharine juices, the combination of a receptacle adapted to initially receive the juice to be treated in conjunction with a suitable treating gas, said receptacle being provided with an outlet conduit of substantial length to permit of the action of said gas on said juice during their passage therethrough, in combination with a retarding chamber at the other end of said outlet, and being provided with internal means for diverting the passage of the juice and gases therethrough and positively retard their passage with a less accelerated movement, enabling the gases to react on the juice to cause a more thorough final impregnation and absorption in said retarding chamber, substantially as described.

12. In apparatus for treating saccharine juices; the combination of a gas chamber; a series of closed hollow truncated inverted cones, suitably mounted in said chamber, the open end of the cone projecting in proximity to the hollow base portion of the next succeeding cone; an inlet for delivering raw juice within the first cone of the series; means for introducing a treating gas or gases to said gas chamber, into initial contact with the incoming raw juice; and a conduit, leading from said gas chamber and disposed to receive the discharge from the last cone of the series, for carrying off the combined juice and gases from said cones and chamber, in countercurrent relation and in the same direction of flow, substantially as described.

13. In apparatus for treating saccharine juices; the combination of a gas chamber; a series of closed hollow truncated inverted cones, suitably mounted in said chamber, the open end of one cone projecting in proximity to the hollow base portion of the next succeeding cone; an injector for delivering the

2 App-273

Defendant's Exhibit 44-4

1,195,044 3

saccharine juice within the first cone of the series; means for introducing treating gas into said gas chamber; and a conduit leading from said gas chamber and disposed to receive the discharge from the last cone of the series, said conduit consisting of a plurality of tubular elements, including a conical throat, similarly disposed as said internal cones, communicating with and closing the bottom of said gas chamber, and an oppositely disposed conical tube, having its apex end adjoining and communicating with the open apex end of said conical throat, substantially as described.

14. In apparatus for treating saccharine juices; the combination of a retarding chamber having a delivery outlet; and means coöperating therewith to initially treat the incoming juice with a treating gas, and conducting same to said retarding chamber, in commingled relation and in the same direction of flow, said retarding chamber being provided with alternately opposed overlapping baffles, for diverting the passage of the treated juice therethrough in a tortuous path and with a less accelerated movement, enabling the gases to react on the juice and cause a more thorough final impregnation and absorption of the treating gas by said juice, substantially as described.

15. In apparatus for treating saccharine juices; the combination of a gas chamber; an injector for delivering the juice to said chamber at a substantial pressure; means for introducing a treating gas to said chamber into contact with said incoming juice; means in said chamber for aiding the initial mixture of said juice and treating gas; a conduit leading from said gas chamber and extending a substantial distance below same for conducting said juice and entrained gas from said chamber, in the same direction of flow, and enabling said gas to act on said juice; a retarding chamber at the lower end of said conduit and communicating at its bottom therewith, said retarding chamber extending vertically of said conduit, and being provided with a discharge outlet at its upper end; and baffling means within said retarding chamber for obstructing and diverting the passage of the ascending treated juice, causing the same to flow upwardly at a diminished speed to permit a prolonged reaction of the gases on the juice and cause a more thorough final impregnation and absorption of the treating gases by said juice, substantially as described.

16. In apparatus for treating saccharine juices; the combination of a gas chamber; a series of alined hollow truncated inverted cones, suitably mounted in said chamber, the apex of one cone projecting in proximity to the hollow base portion of the next succeeding cone; an injector for delivering the saccharine juice under a substantial pressure, within the first cone of the series; means for introducing treating gas into said chamber into initial contact with the incoming juice; a conduit communicating with the bottom of said gas chamber and disposed to receive the discharge from the last cone of the series, said conduit extending a substantial distance below said chamber; a retarding chamber communicating at its bottom with the lower end of said conduit, said retarding chamber extending vertically alongside of said conduit and being provided with a discharge outlet at its upper end; and a series of alternately opposed overlapping baffles located in said retarding chamber, for obstructing and diverting the course of the ascending juice into a tortuous path, causing the same to flow upwardly at a diminished speed, substantially as described.

In testimony whereof I affix my signature.

NELSON A. LOCKWOOD.

N° 6012 **A.D. 1909**

(Under International Convention.)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in Germany), } **13th July, 1908**

Date of Application (in the United Kingdom), 12th Mar., 1909

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 18th Nov., 1909

COMPLETE SPECIFICATION.

Improvements in or relating to Mixing Devices.

We, FELTEN AND GUILLEAUME-LAHMEYERWERKE ACTIENGESELLSCHAFT, of 45, Höchsterstrasse, Frankfort on Main, Germany, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a new mixing device chiefly intended for producing such mixtures from a gas or vapour-like substance and a liquid substance, in which either the one or the other substance or the mixture are unstable. A special important field of application for the new mixing device are ozone apparatus in which ozone-containing air is to be mixed as quickly and thoroughly as possible with a liquid to be ozonised for instance for the purpose of sterilising, since it is well known that ozone decomposes very quickly and loses its efficiency.

The present invention comprises a jet apparatus for mixing gases with fluids provided in the mixing chamber through which the fluid passes, with several

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Accepted, 18th Nov., 1909

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This invention relates to a new mixing device chiefly intended for producing such mixtures from a gas or vapour-like substance and a liquid substance, in which either the one or the other substance or the mixture are unstable. A special important field of application for the new mixing device are ozone apparatus in which ozone-containing air is to be mixed as quickly and thoroughly as possible with a liquid to be ozonised for instance for the purpose of sterilising, since it is well known that ozone decomposes very quickly and loses its efficiency.

The present invention comprises a jet apparatus for mixing gases with fluids provided, in the mixing chamber through which the fluid passes, with several plates bent, preferably, in the form of baskets and provided with apertures in such a manner that the apertures of one plate always lie over the full portions of the next plate, so that the jet of fluid between each two plates is divided into several divisional currents striking against each other.

A construction of the mixing device according to this invention is illustrated in the accompanying drawing.

Figure 1 is a longitudinal section through the apparatus.

Figures 2, 3 and 4 show the plates arranged in the path of the liquid jet in bottom view, side elevation and plan.

The body *a* of the mixing apparatus which of course could also consist of several parts, serves as an injector. It is connected by means of the screw-thread *b* to the liquid pipe, and the liquid passes through the perforation *c*, and the gaseous substance, for instance, ozone-air, through a perforation *d* into the conically widening chamber *e*, the widening of which produces in a well known manner the suction of the gas from the perforation *d* owing to the flow of the liquid from the perforation *c* into the widened chamber *e*.

In the path of the liquid jet are arranged according to this invention several plates *f* bent in the shape of a basket, the bottoms of which are provided with apertures *h*. When the plates are inserted into the body *a*, the apertures *h* are

Note

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in such position that the apertures of one plate lie over the full portions of the other plates. They are secured in that position by the plates *f* being provided with projections *i* by means of which each plate engages with the apertures *h* of the adjoining plate.

The plates *f* are secured in the interior of the body *a* by means of a screw cap *g*.

The parts *f* could also be made of short tubes provided with finger-like projections bent in such a manner as to form a basket shaped bottom.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A jet apparatus for mixing gases with fluids provided, in the mixing chamber through which the fluid passes, with several plates bent, preferably, in the form of baskets and provided with apertures in such a manner that the apertures of one plate always lie over the full portions of the next plate, so that the jet of fluid between each two plates is divided into several divisional currents striking against each other.

2. A jet apparatus according to Claim 1 in which the plates are provided at their edges with projections which engage with the apertures of the following plates for the purpose of securing the plates in position.

3. The complete mixing device substantially as described or as illustrated in the accompanying drawings.

Dated this 11th day of March, 1909.

BOULT, WADE & TENNANT,
111 & 112, Hatton Garden, London, E.C.,
Chartered Patent Agents.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1909.

A.D 1909. March 12. № 6012.

FELTEN & *others'* Complete Specification

1 SHEET

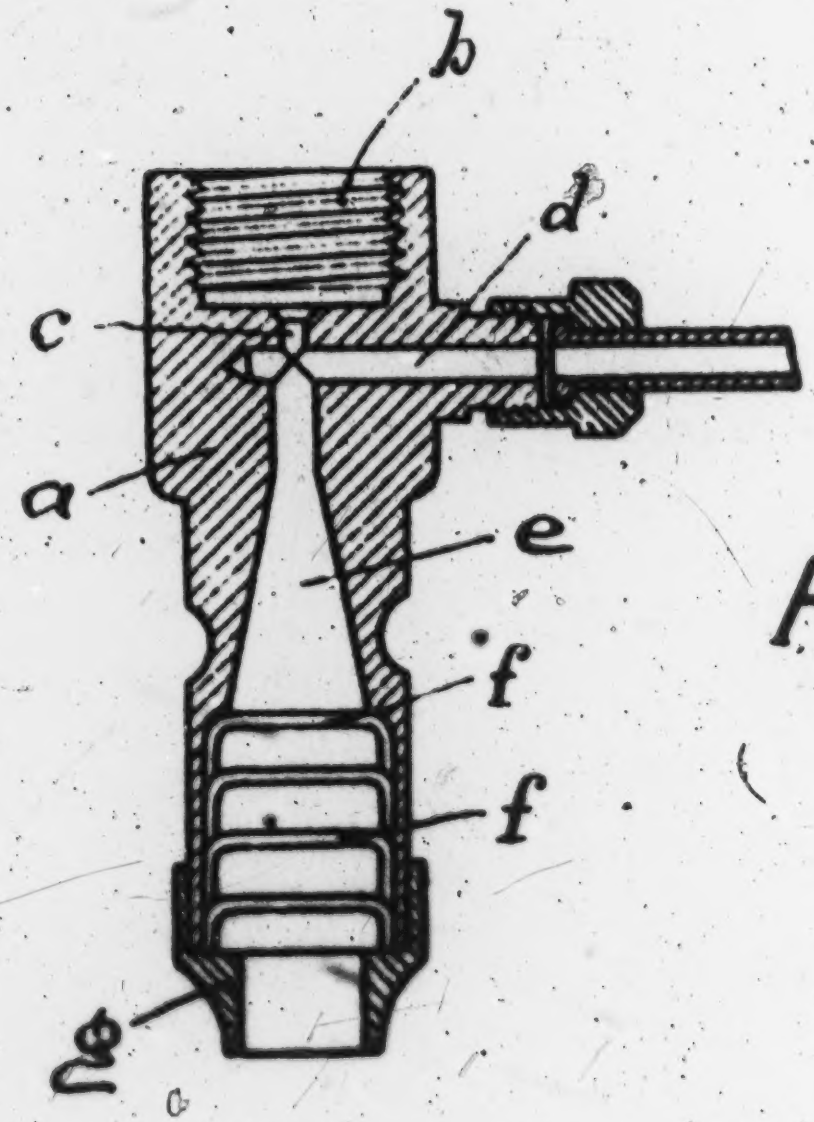

Fig. 1.

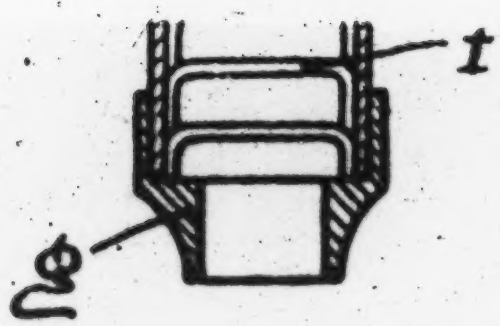

Fig. 2.

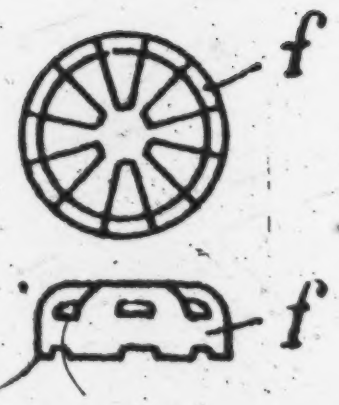

Fig. 3.

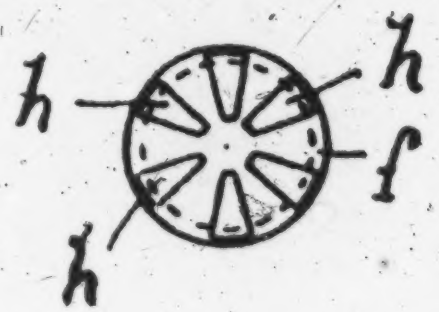

Fig. 4.

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136,663

PATENT SPECIFICATION

Application Date, Dec. 30, 1918. No. 21,760/18.
Complete Left, June 30, 1919.
Complete Accepted, Dec. 24, 1919.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Splash Preventers for Domestic and other Taps.

I, ALFRED JOHN PRASER, Director, of Trafalgar Works, Palmer Street, Bordesley, Birmingham, do hereby declare the nature of this invention to be as follows:

This invention comprises certain improvements in or relating to splash preventers for domestic and other taps.

According to the present invention, I provide a rubber tubulus adapted to be fixed over the delivery part of the tap, and I combine with the lower extremity of said tubulus a metallic nozzle. A strainer may be incorporated.

In a convenient embodiment of the present invention, the tubulus is furnished around the top with an external integral rim or flange which strengthens it. At or near its lower extremity the tubulus is formed with an internal annular recess or shoulder. This is adapted to receive the upper rim of a sheet metal nozzle which converges downwardly. Said nozzle may be of taper form throughout its part which depends from the tubulus; above this taper part it may have an integral short cylindrical part and at the top of said cylindrical part the metal is spun or otherwise formed to an outwardly projecting rim or head. This rim or head is adapted to form an internal channel which embraces the outer edge of wire gauze adapted to function as a strainer. The said rim or head is externally adapted to be received by the annular recess in the tubulus. At its lower extremity the tubulus may have an internal flange or may be otherwise moulded to conform with the external surface of the upper part of the taper portion of the metallic nozzle. The metallic nozzle part may be assembled from the upper extremity of the tubulus through the interior of the latter.

In a modified embodiment of the present invention, the rubber tubulus is provided at its lower as well as at its upper extremity with an external flange or enlargement, and the metallic nozzle is formed at its upper part with an internal annular channel adapted to receive the lower enlargement of the tubulus. Between the lower extremity of the tubulus and the lower side of the

Application Date, Dec. 30, 1918. No. 21,780/18.
Complete Left, June 30, 1919.
Complete Accepted, Dec. 24, 1919.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Splash Preventers for Domestic and other Taps.

I, Alfred John Fraser, Director, of Trafalgar Works, Palmer Street, Bordesley, Birmingham, do hereby declare the nature of this invention to be as follows:

This invention comprises certain improvements in or relating to splash preventers for domestic and other taps.

According to the present invention, I provide a rubber tubulus adapted to be fixed over the delivery part of the tap, and I combine with the lower extremity of said tubulus a metallic nozzle. A strainer may be incorporated.

In a convenient embodiment of the present invention, the tubulus is furnished around the top with an external integral rim or flange which strengthens it. At or near its lower extremity the tubulus is formed with an internal annular recess or shoulder. This is adapted to receive the upper rim of a sheet metal nozzle which converges downwardly. Said nozzle may be of taper form throughout its part which depends from the tubulus; above this taper part it may have an integral short cylindrical part and at the top of said cylindrical part the metal is spun or otherwise formed to an outwardly projecting rim or head. This rim or head is adapted to form an internal channel which embraces the outer edge of wire gauze adapted to function as a strainer. The said rim or head is externally adapted to be received by the annular recess in the tubulus. At its lower extremity the tubulus may have an internal flange or may be otherwise moulded to conform with the external surface of the upper part of the taper portion of the metallic nozzle. The metallic nozzle part may be assembled from the upper extremity of the tubulus through the interior of the latter.

In a modified embodiment of the present invention, the rubber tubulus is provided at its lower as well as at its upper extremity with an external flange or enlargement, and the metallic nozzle is formed at its upper part with an internal annular channel adapted to receive the lower enlargement of the tubulus. Between the lower extremity of the tubulus and the lower side of the annular channel within the upper part of the nozzle a disc or discs of wire gauze may be incorporated to function as a strainer. The depending part of the metallic nozzle may be of taper form as in the previous embodiment.

By virtue of the elasticity of the rubber the metallic and rubber parts of the splash preventer may be readily separated and reassembled. The splash

preventer according to the present invention also forms an effective crockery guard.

Dated this 24th day of December, 1918.

LEWIS WM. GOULD, A.I.Mech.E.,
Fellow of the Chartered Institute of Patent Agents,
Agent for the Applicant,
5, Corporation Street, Birmingham.

COMPLETE SPECIFICATION.

Improvements in or relating to Splash Preventers for Domestic and other Taps.

I, ALFRED JOHN PURSER, Director, of Trafalgar Works, Palmer Street, Bordesley, Birmingham, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to splash preventers for domestic and other taps, which are constructed of two parts or elements connected together, one part or element being formed of rubber or the like adapted to be fixed over the delivery part of the tap, and the other part or element constituting a metal nozzle; a suitable strainer being incorporated with such two-part device.

Previously an arrangement has been proposed in which a metal nozzle is detachably assembled at the extremity of a tubular rubber attachment portion, in which arrangement however, such metal nozzle has involved a plurality of parts screwed together, one of which parts being permanently secured within the rubber portion, and the other part being screwed upon the first part, while in another proposed arrangement the employment of a one-piece metal nozzle has necessitated the provision of an additional metal member adapted to be inserted within the rubber tubulus for securing the nozzle and tubulus together.

According to the present invention a splash preventer, which also serves as a crockery guard, is provided, comprising a one-piece metallic nozzle portion adapted to be assembled in a readily detachable manner at or near the lower extremity of the rubber tubulus by the detachable insertion of a rim or flange part within a channel or recess, the rubber tubulus extending beyond the upper edge of the metallic nozzle for attachment upon the tap.

In order that this invention may be clearly understood, and readily carried into practice, reference may be had to the appended explanatory sheet of drawings, upon which:—

Figure 1 is a vertical section of one form of splash preventer according to this invention.

Figure 2 is a vertical section of a modified form of a splash preventer.

In a convenient embodiment of the present invention, as shown in Figure 1, the tubulus a is furnished around the top with an external integral rim or flange a^1 which strengthens it. At or near its lower extremity the tubulus is formed with an internal annular recess or shoulder a^2. This is adapted to receive the upper rim b^1 of a sheet metal nozzle b which converges downwardly. Said nozzle b may be of taper form throughout its part which depends from the tubulus a; above this taper part it may have an integral short cylindrical part b^2 and at the top of said cylindrical part b^2 the metal is spun or otherwise formed to an outwardly projecting rim or head b^1. This rim or head b^1 is adapted to form an internal channel which embraces the outer edge of one or more wire gauze portions c adapted to function as a strainer. The said rim or

Defendant's Exhibit 44-3

2 App. 259

No. 881,548. PATENTED MAR. 10, 1908.

C. A. CLAFLIN.

AIR EXHAUSTING LIQUID SUPPLY APPARATUS.

APPLICATION FILED OCT. 9, 1907.

2 SHEETS—SHEET 2.

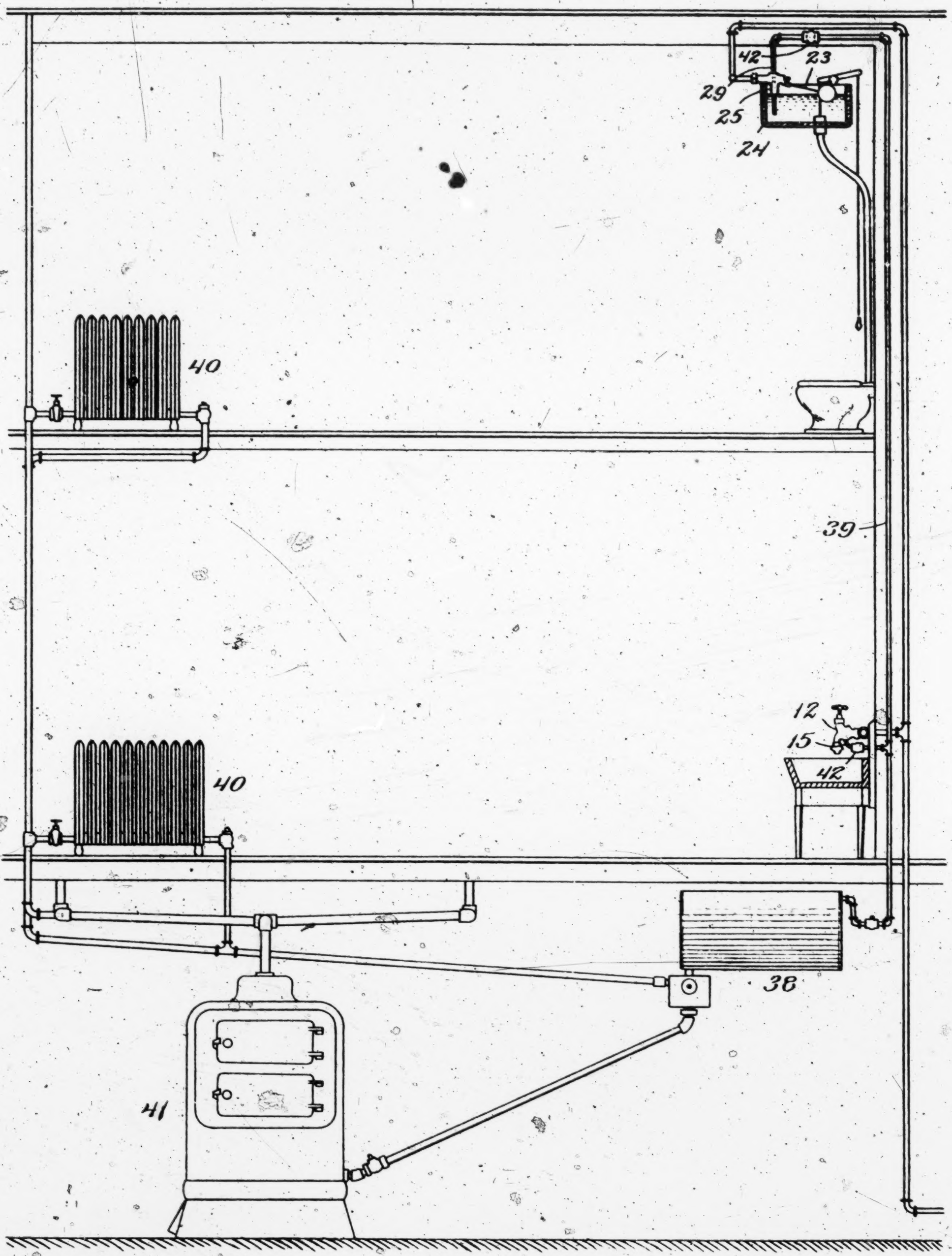


Fig. 6

Witnesses:
Peter H. Peggott
E. Belchelder

Inventor
Charles A. Claflin
by Wright Brown Quinby & May
Attorneys.

Defendant's Exhibit 44-4

2 App. 265

N. A. LOCKWOOD.

APPARATUS FOR THE GASEOUS TREATMENT OF SACCHARINE JUICES.

APPLICATION FILED FEB. 9, 1916.

1,195,044.

Patented Aug. 15, 1916.

2 SHEETS—SHEET 1.

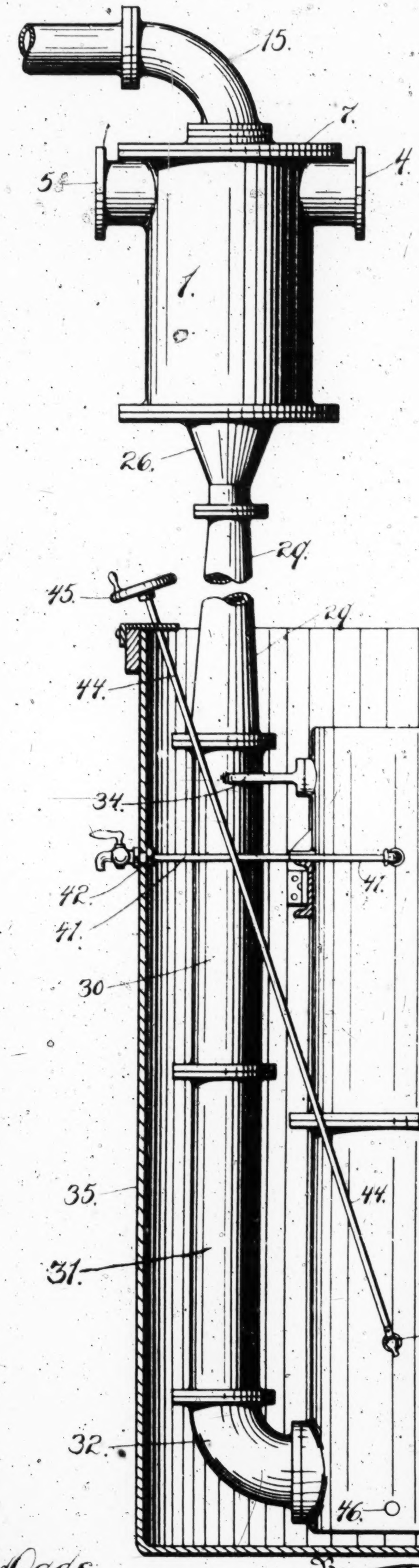


Fig. 1.

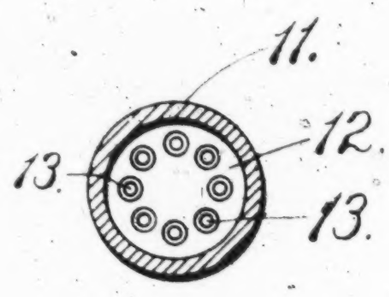


Fig. 4.

Witness
John B. Wade.

Inventor
N. A. Lockwood.
By Wilkinson, Gunstat & Mackaye
his Attorneys.

Defendant's Exhibit 44-4

2 App. 267

N. A. LOCKWOOD.

APPARATUS FOR THE GASEOUS TREATMENT OF SACCHARINE JUICES.

APPLICATION FILED FEB. 9, 1916.

1,195,044.

Patented Aug. 15, 1916.

2 SHEETS—SHEET 2

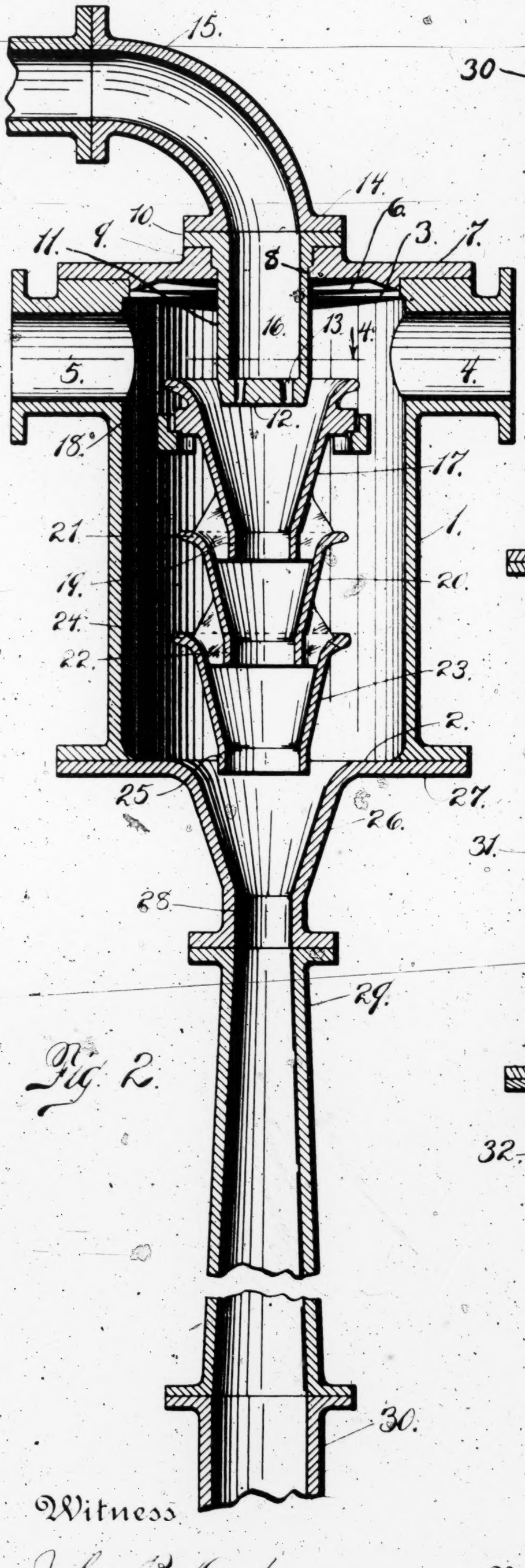


Fig. 2.

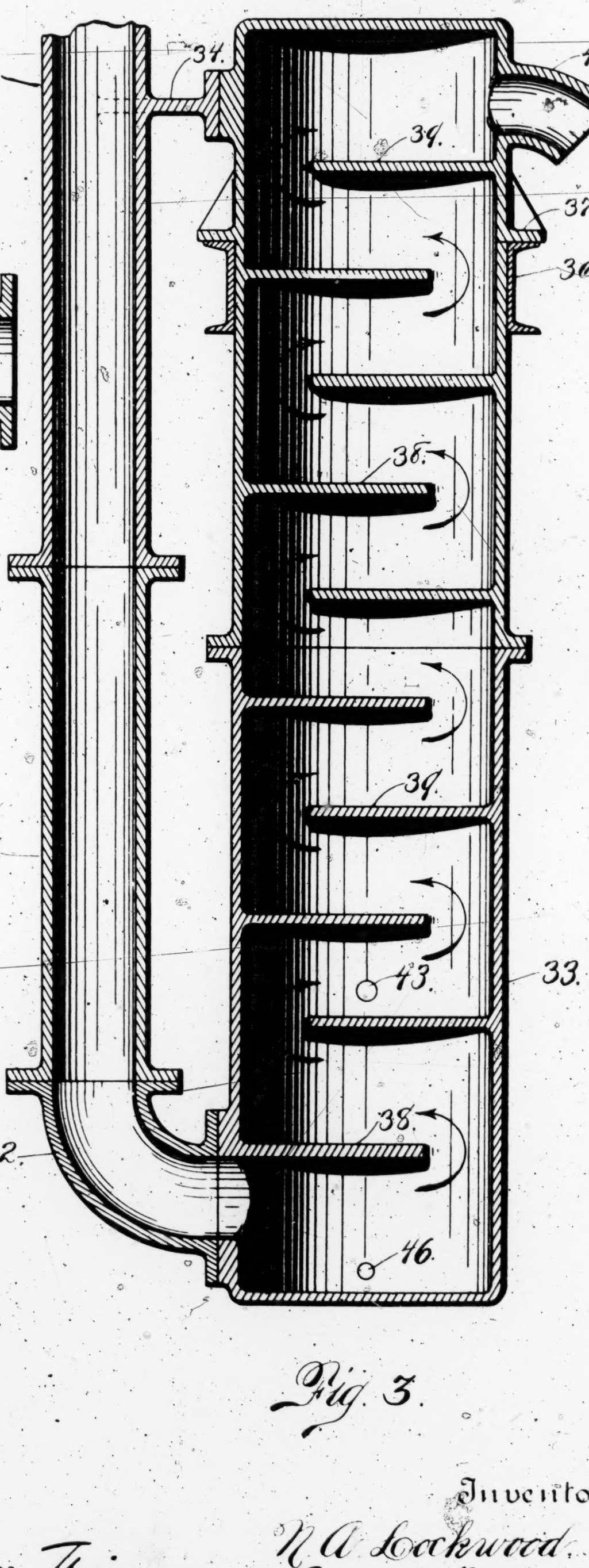


Fig. 3.

Witness
John B. Wade.

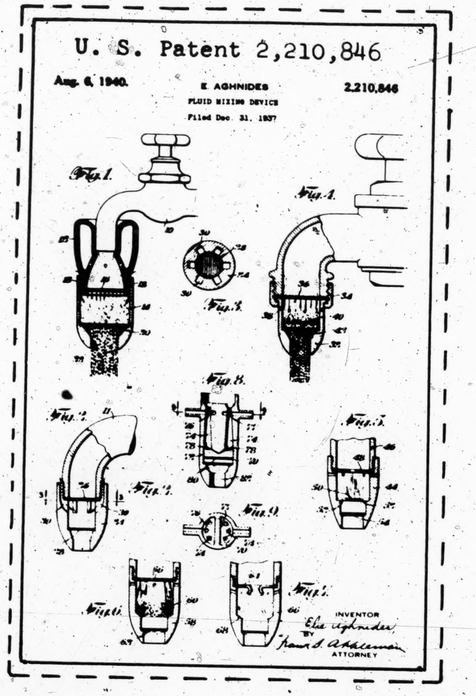
Inventor
N. A. Lockwood.
By Wilkinson, Giusta & Mackaye
his Attorneys.

Chart No. 1

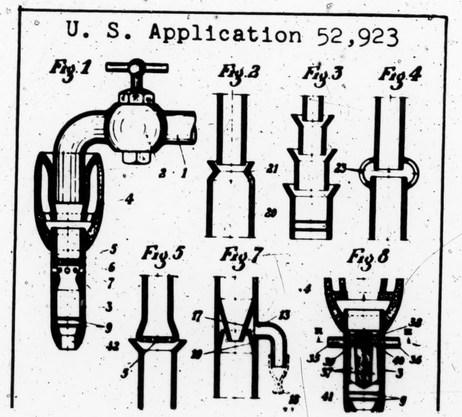
In the United States
Aghnides has sworn that these patents
within the red enclosure are the same invention.

(RED)

U. S. Patent 2,210,846



U. S. Application 52,923



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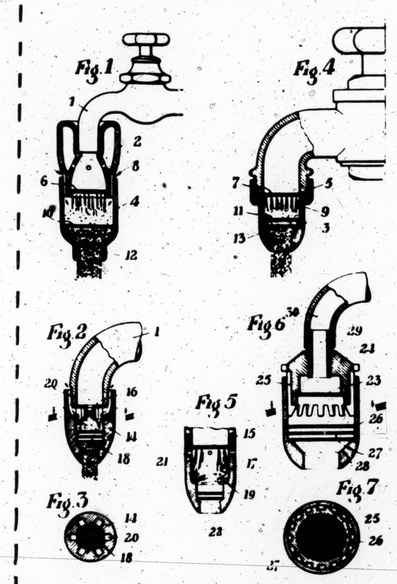
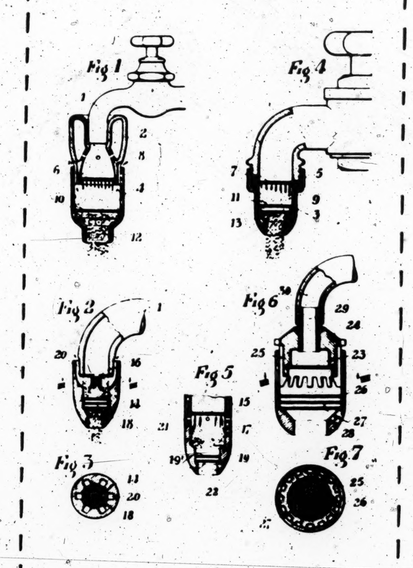
In Canada
Aghnides has sworn that

(GREEN)

Canada Patent 490,112



British Patent 625,084



U. S.
2,210,846 *

is a different invention from both

Belgium
406,702

and

British
468,687

"CHART No. 1"

Defendant's Exhibit 44-11 2 App. 301

M. FUSS.

SYSTEM FOR TREATING LIQUIDS WITH OZONE.

APPLICATION FILED APR. 9, 1909.

1,090,044. Patented Mar. 10, 1914.

2 SHEETS—SHEET 2.

Fig. 7.

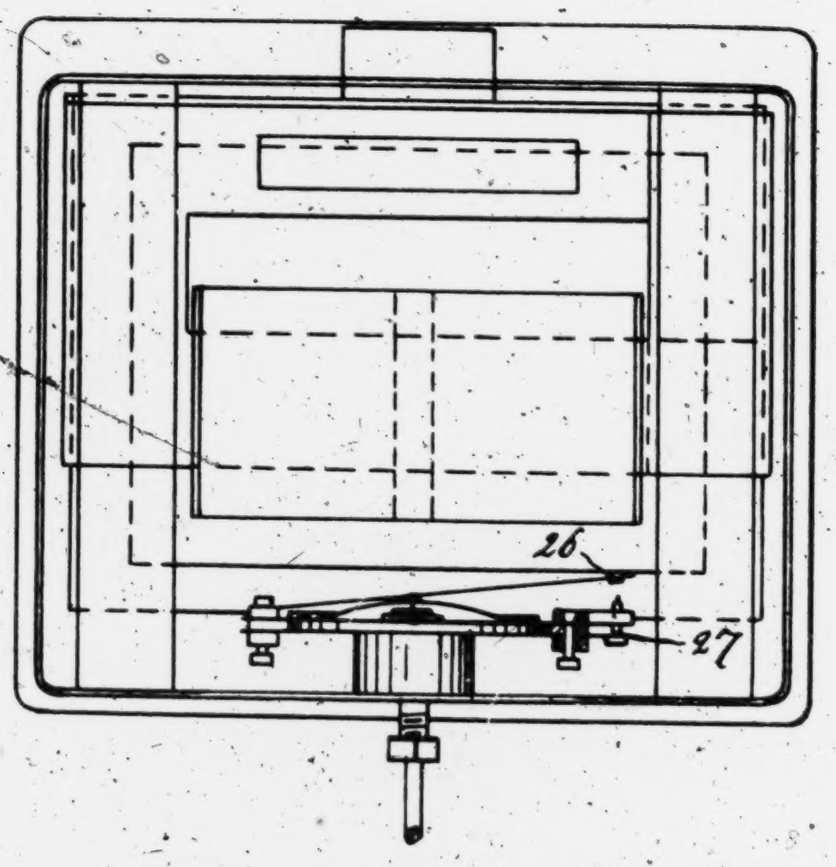


Fig. 6.

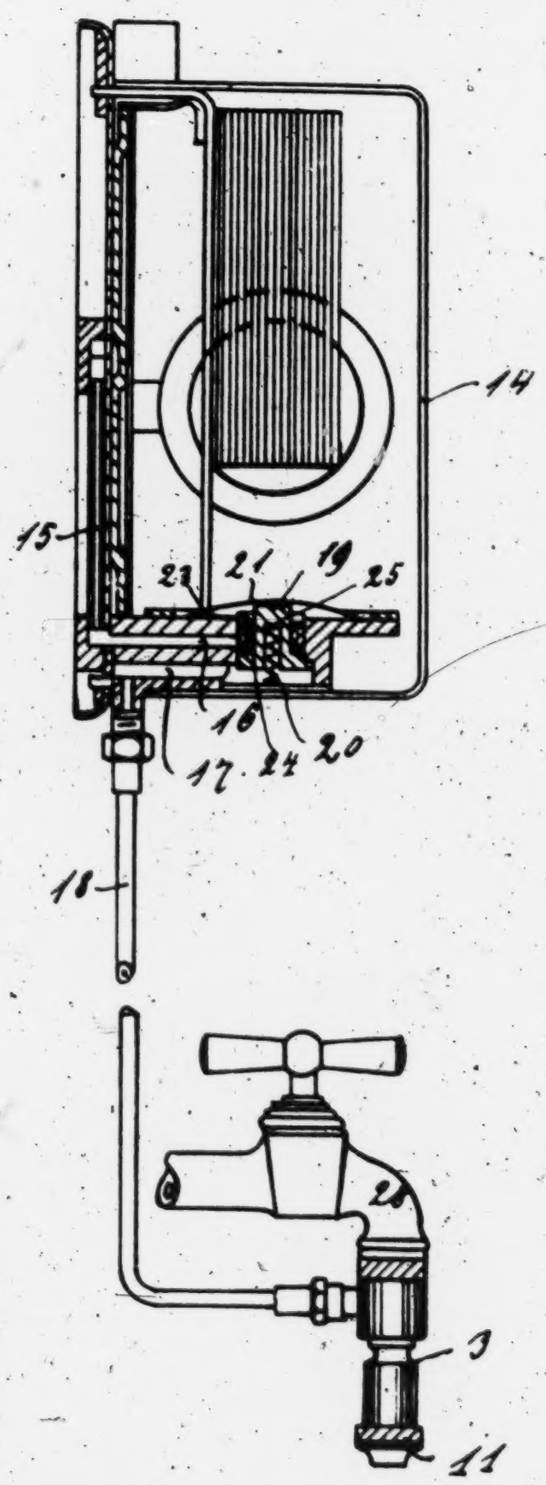


Fig. 2.

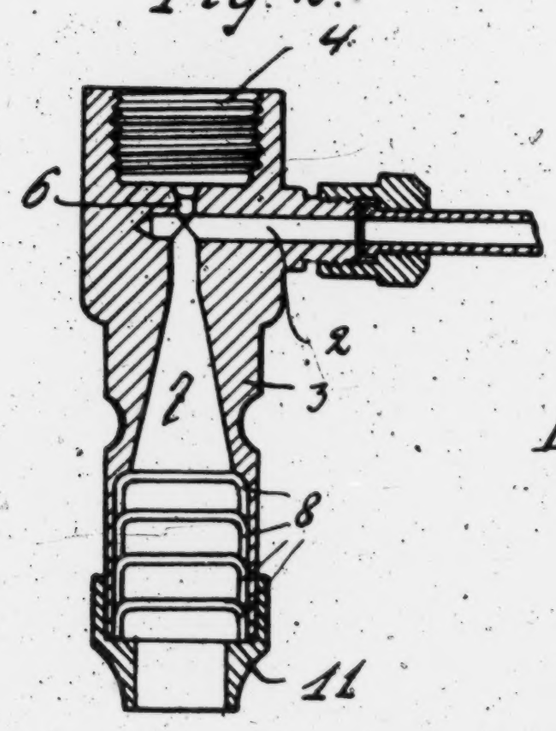


Fig. 3.

Fig. 4

Fig. 5

Witnesses:
J. J. McCarthy
M. G. Crandell

Inventor:
Max Fuss
by Foster Freeman Watson & Coit
Attorneys

A.D. 1898. JUNE 1. N°. 12,315.

VIELLARD'S COMPLETE SPECIFICATION.

1 SHEET

FIG. 1.

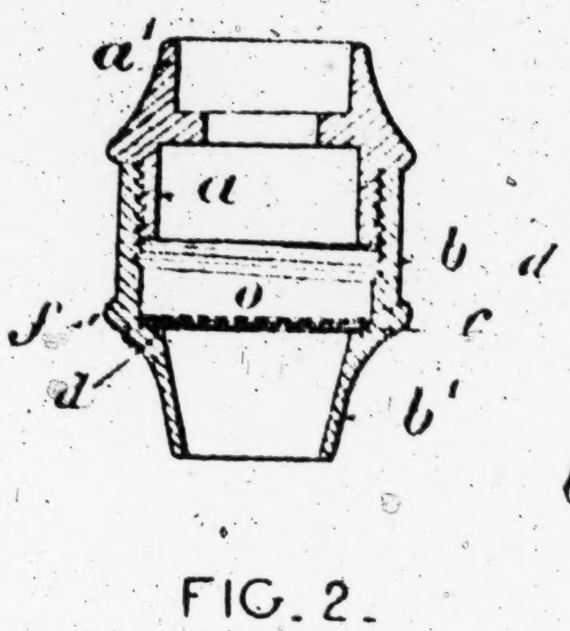


FIG. 3.

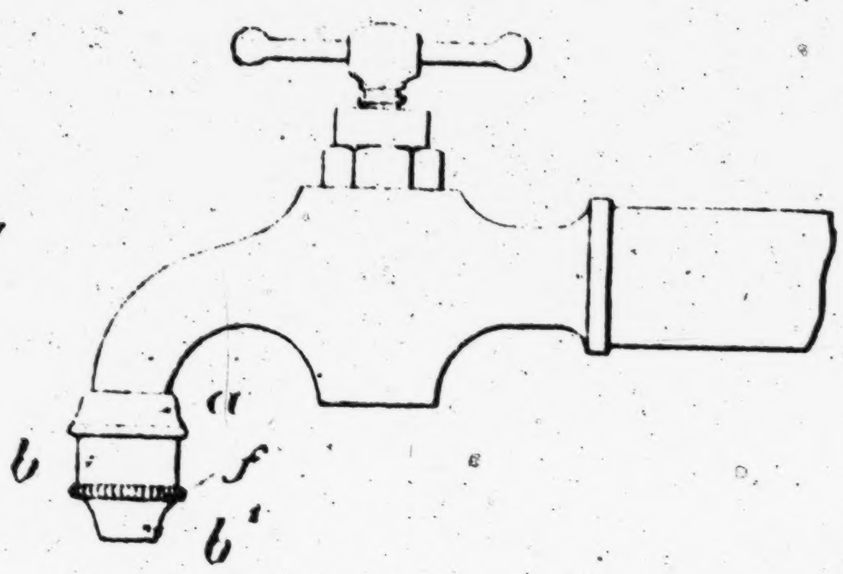


FIG. 2.

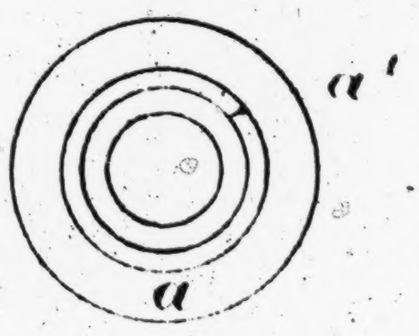


FIG. 4.

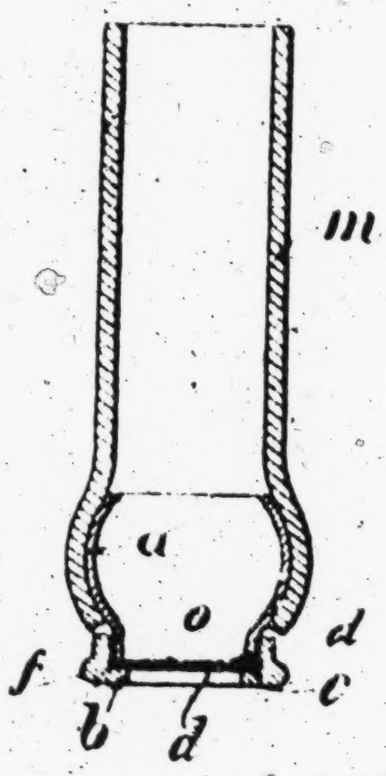


FIG. 5.

FIG. 6.

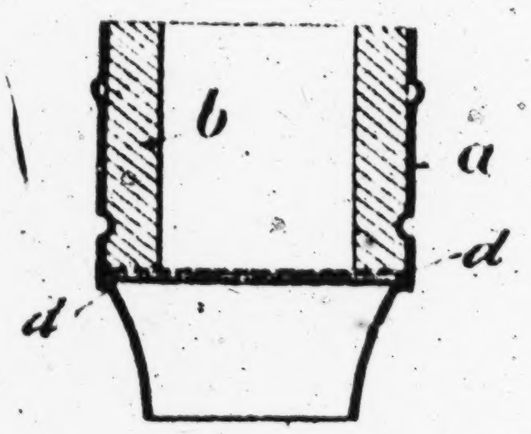


FIG. 8

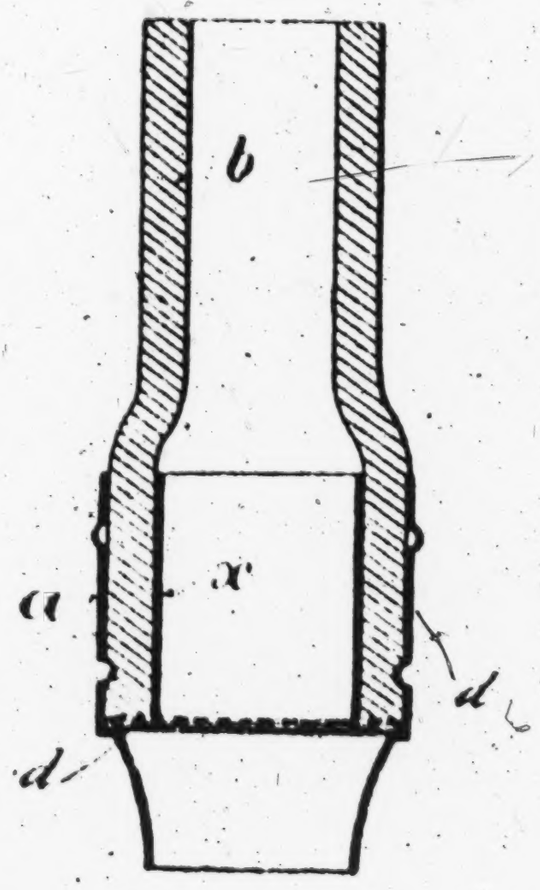
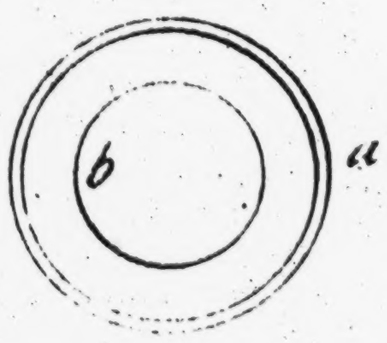


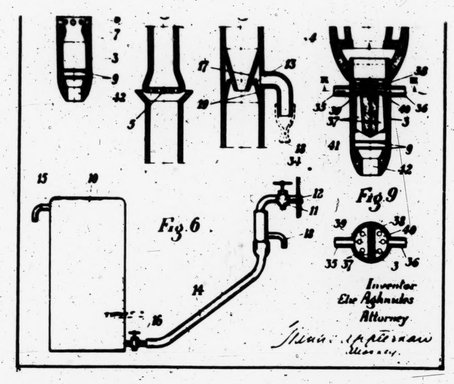
FIG. 7.



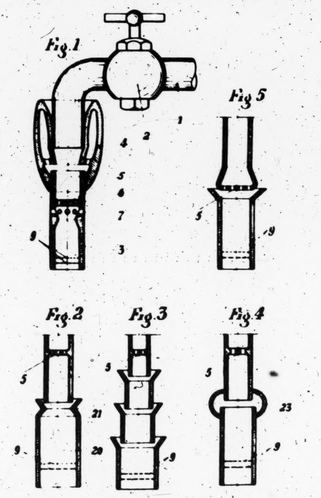
This Drawing is a reproduction of the Original on a reduced scale.

Malby & Sons, Photo-Litho.

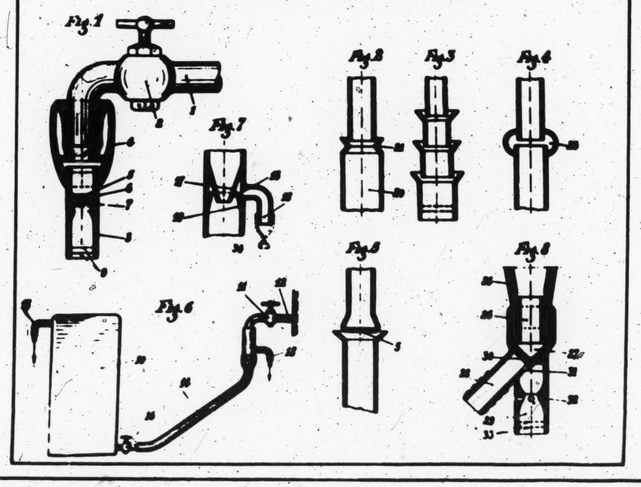
DEPARTMENT OF COMMERCE



British Patent 468,687



Belgium Patent 406,702



1b.

2.

3.

1b.

Belgium 406,702 and British 468,687

In the United States Aghnides has sworn that

U. S. 2,210,846 *

is the same invention as both

Belgium 406,702 and British 468,687

2.

In Canada Aghnides has sworn that

Canada 490,112 *

is a different invention from both

Belgium 406,702 and British 468,687

3.

In Canada Aghnides has sworn that

British 625,084

is a different invention from

British 468,687

:

* (Th an 49

* (The five claims of U. S. Patent 2,210,846 and the five claims of Canadian Patent 490,112 are identical.)

head b^1 is externally adapted to be received by the annular recess a^2 in the tubulus a. At its lower extremity the tubulus a may have an internal flange or may be otherwise moulded to conform with the external surface of the upper part of the taper portion of the metallic nozzle b. The metallic nozzle part may be assembled from the upper extremity of the tubulus through the interior of the latter.

In a modified embodiment of the present invention (Figure 2), the rubber tubulus a is provided at its lower extremity with an external flange or enlargement a^3 similar to the upper flange a^1, and the metallic nozzle b is formed at its upper part with an internal annular channel b^4 adapted to receive the lower enlargement a^3 of the tubulus a. Between the lower extremity of the tubulus a and the lower side of the annular channel b^3 within the upper part of the nozzle b, a disc c or discs of wire gauze may be incorporated to function as a strainer. The depending part of the metallic nozzle b may be of taper form as in the previous embodiment.

By virtue of the elasticity of the rubber the metallic and rubber parts of the splash preventer may be readily separated and reassembled. The splash preventer according to the present invention also forms an effective crockery guard.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. A splash preventer for domestic and other taps, which also serves as a crockery guard, comprising a one-piece metallic nozzle portion adapted to be assembled in a readily detachable manner at or near the lower extremity of the rubber tubulus by the detachable insertion of a rim or flange part within a channel or recess, the rubber tubulus extending beyond the upper edge of the metallic nozzle for attachment upon the tap.

2. A splash preventer as claimed in Claim 1 and in which the rubber tubulus is formed with an external rim or flange at both its upper and lower extremities, the metallic nozzle being formed at its upper part with an internal annular channel for receiving the lower rim of the tubulus.

3. A splash preventer as claimed in Claim 1 and in which a rim or flange at the upper part of the nozzle portion is adapted to form an internal channel for embracing or receiving the outer edge of one or more wire gauze portions or like straining elements.

4. A splash preventer as claimed in Claim 2 and in which one or more portions of gauze or straining elements are incorporated between the rim or flange at the lower extremity of the rubber tubulus and the lower side of the annular channel in the upper part of the nozzle.

5. A splash preventer for domestic and other taps substantially as herein set forth or illustrated.

Dated this 24th day of June, 1919.

LEWIS WM. GOOLD, A.I.Mech.E.,
Fellow of the Chartered Institute of Patent Agents,
Agent for the Applicant,
5, Corporation Street, Birmingham.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1920.

136,663 PURSER'S COMPLETE SPECIFICATION. (1 SHEET)

[This Drawing is a full-size reproduction of the Original.]

Fig. 1.

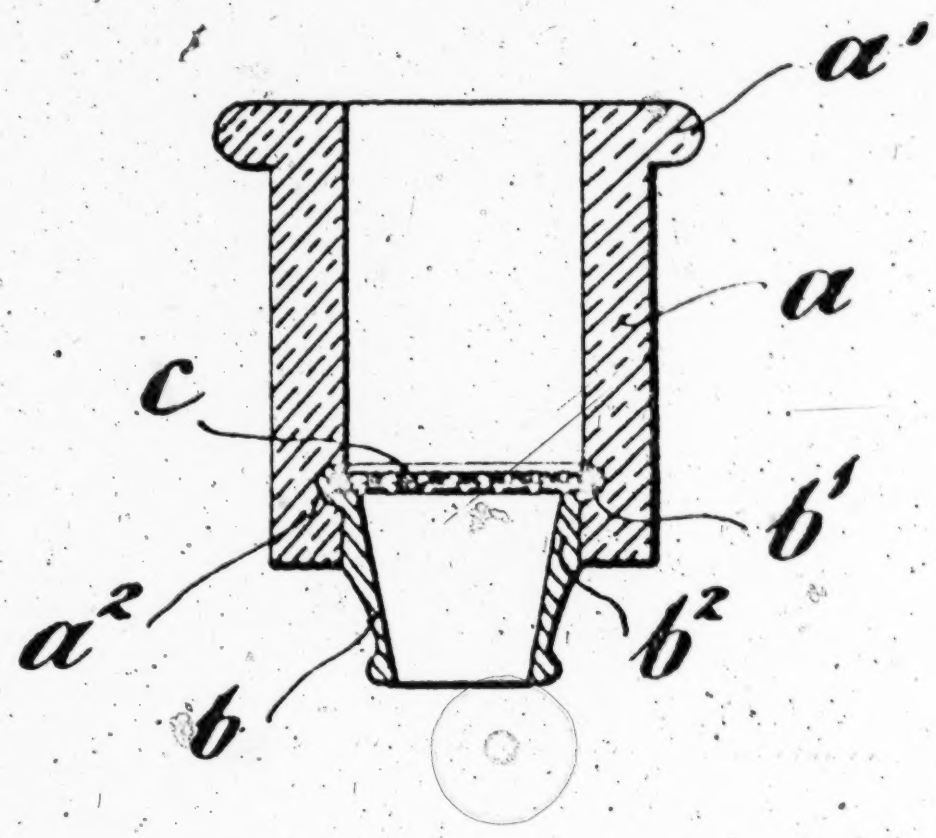
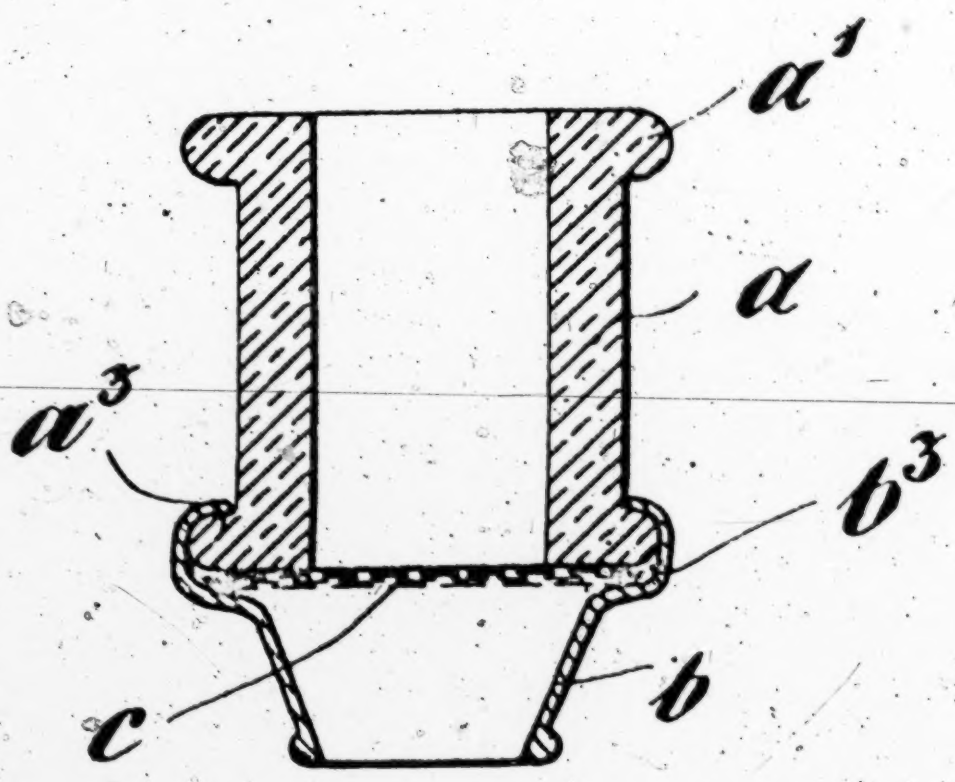


Fig. 2.



Defendant's Exhibit 4483

2 App. 283

PATENT SPECIFICATION

323,242

Application Date: June 28, 1928. No. 18,836/28.

Complete Left: March 28, 1929.

Complete Accepted: Dec. 30, 1929.

PROVISIONAL SPECIFICATION.

Improvements relating to Apparatus for Aerating and Blending Liquids.

I, JOHN WILLIAM BATTERSBY, a British Subject, of 119, Bishopsgate, London, E.C. 2, do hereby declare the nature of this invention to be as follows:—

This invention relates to apparatus for aerating and blending liquids, and in particular for aerating water and blending with it some kind of flavouring to make a hot or cold drink. Although primarily the invention is intended to aerate water and to blend with it fruit juices, syrups, essences, cordials, and the like, the invention is equally effective in aerating and blending spirits such as whiskey or brandy with water. The object is to enable such spirits to be aerated and blended with plain water instead of with soda water as has been usual previously, the result being that the drink is rendered more palatable and the flavour is improved.

According to the present invention the liquid, which may be called the flavouring liquid, is admitted at a controlled rate to a conduit preferably in the form of a pipe, and the liquid with which it is to be blended, which may be called the primary liquid, is forced through a nozzle so that it is formed into a sharp jet stream and draws in air through apertures in a suitable position, and in that condition impinges upon the inflowing flavouring liquid, penetrates it and breaks it up. In the preferred apparatus, the primary liquid is forced through a jet consisting of a perforation at the apex of a cone-shaped nipple and arranged centrally in a pipe, the walls of which are perforated to admit air at some distance in front of the aperture; the flavouring liquid is thus blended and aerated and received in a receptacle, usually a drinking glass, through an outlet to the pipe which may be shaped to prevent undue splashing.

It will be convenient to describe one particular form of apparatus constructed in accordance with this invention, and particularly adapted for use on a service counter as a substitute or as an alternative for the soda fountain now in general use. In this preferred form, merely given as an example, the apparatus comprises a vertical hollow pillar secured by screws or otherwise to the top of a counter, and made of ornamental shape and attractively finished, for example, by nickel plating. A water pipe is mounted centrally in this pillar and is connected with the mains through the bottom of the pillar or through the side near the foot, the water either passing direct through the pipe or through a cooler or heater, before flowing to the pipe. Near the top of the pillar the pipe turns horizontally through the wall of the pillar and is fitted with a tap, the outlet of which is directed downwardly. A pressure union or chamber is screwed to the outlet of the tap and extends downwardly, and into it screws a flanged pipe with its side perforated like a bunsen burner. Between these parts, and clamped on a seating in the flanged pipe is a conically dished nozzle which is thus clamped with its aperture at the apex of the cone lying centrally in the pipe. With the apparatus so far described, if the water is turned on, the result is that there is a downwardly directed jet or spray in which the water is finely sub-divided and which moves at a high velocity so as to draw in air laterally, and if this jet is received in a receptacle the water is highly aerated and remains aerated for an appreciable time. It is known, however, that the addition of a second liquid such as spirit or a flavouring juice or syrup enables the mixture to be more highly aerated and for the air bubbles to be maintained for a considerably longer time. The present apparatus, therefore, has an extension tube or bottom nozzle screwed on to the flanged tube. This extension tube is conically reduced in cross-section at its lower end, and below the cone a side tube is fixed to the pipe and has communication with a calibrated container which may be of plated or tinned metal, or of glass, or porcelain. This container is intended to receive a measured amount of fruit juices, syrup, cordial, or spirits, such as whiskey or brandy, and when the controlling valve in the connecting pipe is opened a pre-determined amount of the flavouring liquid flows at a regulated rate by gravity into the vertical pipe and the jet of aerated water impinges upon it,

penetrates it, and mixes the flavouring liquid with water. Below the junction between the vertical pipe and the horizontal pipe, the vertical pipe is extended downwards and at its foot may be fitted with any form of anti-splash device. The result is a blended drink, highly aerated, which may be received in a glass or other receptacle. The blending, atomising, and aeration of the liquids is intensified and completed by the jet stream impinging on the walls of the glass or other receptacle or on the contents or both, combined with the violent agitation set up in the receptacle.

When plain drinking water is aerated the visible air bubbles soon disappear, although if the aerated water is examined under a powerful lens the air is seen in suspension for some time afterwards. If, however, any fruit juice, syrup, cordial, or spirit is introduced the aeration is held for a longer time according to the density and colloidal properties of the blended liquids.

In comparing the method of blending drinks in accordance with this invention with the use of soda water, it must be observed that in the latter case an alkaline solution is added with a considerable amount of carbon dioxide gas which creates a gaseous effervescence. It may be stated that the effect of the soda water with whiskey is to break up the fusel oil, the particles of which become surrounded by carbon dioxide gas, thus nullifying the unpalatable oily taste. With the apparatus in accordance with the present invention, this fusel oil is also broken up, due to the penetrative force and atomising effect of the jet stream, and the particles of the oil are thereby coated with air bubbles. Thus the same physical effect is obtained as with soda water, and the peculiar and somewhat disagreeable taste is overcome. Also, the so-called "gassy" after effect does not occur, as the air in the beverage is very readily absorbed by the human system. Another valuable feature is the refreshing and invigorating effect of a purely air aerated fruit juice, cordial, syrup, or the like, on the human body, compared with soda water, which introduces an excess of chemicals as well as carbon dioxide gas, and causes an enervated condition with subsequent feeling of depression in the system. Further the bouquet and flavour of the beverages blended and aerated with the apparatus of this invention are enhanced to a very marked degree and rendered much more agreeable to the palate than if mixed with either soda water or plain water.

Dated this 28th day of June, 1928.

For the Applicant:

H. A. GILL & Co.,

Chartered Patent Agents,

51/52, Chancery Lane, London, W.C. 2.

COMPLETE SPECIFICATION.

Improvements relating to Apparatus for Aerating and Blending Liquids.

I, JOHN WILLIAM BATTERSBY, a British Subject, of 119, Bishopsgate, London, E.C. 2, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to apparatus for aerating and blending liquids, and in particular for aerating water and blending with it some kind of flavouring to make a hot or cold drink. Although primarily the invention is intended to aerate water and to blend with it fruit juices, syrups, essences, cordials, and the like, the invention is equally effective in aerating and blending spirits such as whiskey or brandy with water. The object is to enable such spirits to be aerated and blended with plain water instead of with soda water as has been usual previously, the result being that the drink is rendered more palatable and the flavour is improved.

According to the present invention the liquid, which may be called the flavouring liquid, is admitted at a controlled rate to a conduit preferably in the form of a pipe, and the liquid with which it is to be blended, which may be called the primary liquid, is forced through a nozzle so that it is formed into a sharp jet stream and draws in air through apertures in a suitable position, and in that condition impinges upon the inflowing flavouring liquid, penetrates it and breaks it up. In the preferred apparatus, the primary liquid is forced through a jet consisting of a perforation at the apex of a cone-shaped nipple and arranged centrally in a pipe, the walls of which are perforated to admit air at some distance in front of the aperture; the flavouring liquid is thus blended and aerated and received in a receptacle, usually a drinking glass, through an outlet to the pipe which may be shaped to prevent undue splashing.

The invention will be more clearly

understood from the following description of a form of the novel apparatus adapted for use on a service counter as a substitute for the soda fountain now in general use. This example will now be described with reference to the accompanying drawings, wherein:—

Figure 1 is a side elevation of the whole apparatus; and

Figure 2 is a central section to an enlarged scale of the part of the apparatus in which the blending and aeration takes place.

The apparatus as illustrated, comprises a vertical hollow pillar *a* arranged to be secured to the top of a counter *b* and made of ornamental shape and attractively finished, for example, by nickel plating. A water pipe *c* is mounted centrally in the pillar *a* and is connected with the water mains through the bottom of the pillar *a*, as shown in full lines, or it may be connected through the side of the pillar *a* near the foot, as shown by dotted lines at *d*. The water may either pass direct from the mains to the pipe *c*, or through a cooler or heater before flowing to the pipe *c*.

Near the top of the pillar *a* the pipe *c* turns horizontally through the wall of the pillar and is fitted with a tap *e*, the outlet *f* of which is directed downwardly. A pressure union *g* is screwed to the outlet *f* of the tap *e* and extends downwardly, and into it screws a flanged pipe *h*. The latter is perforated somewhat like a Bunsen burner, and in fact, as illustrated has two pairs of diametrically opposite holes *j* of one-eighth of an inch in diameter. Between the parts *g*, *h* and clamped on to a seating *k* in the flanged pipe *h* is a conical dished nozzle *l* which is thus clamped with its aperture *m* at the apex of the cone lying centrally in the pipe *h*.

With the apparatus so far described, if the water is turned on, a downwardly directed jet or spray is formed from the nozzle *m* in which the water is finally subdivided and which moves at a high velocity so as to draw in air laterally, and if this jet is received in a receptacle, the water would be highly aerated and would remain aerated for an appreciable time.

It is known, however, that the addition of a second liquid, such as spirit or flavouring juice or syrup, enables the mixture to be more highly aerated and allows the air bubbles to be maintained for a considerably longer time. With this in view, the present apparatus has the lower part of the pipe *h* conically reduced in cross-section at *n*, and below the cone a side tube *o* is fixed to the pipe *h* and affords communication with a calibrated container *p* which, as shown, is of plated metal with an observation window *q* and calibrated scales *r*. It may, however, be of tinned metal or of glass or of porcelain. The container *p* is connected to receive a measured amount of fruit juices, syrup, cordial, or spirits such as whiskey or brandy, and the connecting pipe *o* is provided with a controlling valve *s* which when opened, allows the predetermined amount of the flavouring liquid placed in the container *p* to flow under gravity at a regulated rate into the restricted part of the vertical pipe *h*, at which point the jet of aerated water from the nozzle *m* impinges upon the flavouring liquid, penetrates it, and mixes it with water.

Below the junction between the pipe *o* and the pipe *h*, the latter is extended downwards, and at its foot may be fitted with any form of anti-splash device *t*. Between this and the junction with the pipe *o*, a flow adjuster is provided which may be of any desired kind, but is shown, as an example, as an adjustable screw *u* the stem of which is about one half the diameter of the inside of the bottom part of pipe *h*. This adjuster, when desired, may be moved towards or across the centre of the pipe *h* so that the liquid stream will impinge upon the stem, thus causing the blended liquids to be discharged through the outlet of the pipe *h* in a foaming state. The result is a blended drink highly aerated which is received in the glass *v*. The blending, atomising and aeration of the liquids is intensified by the jet stream impinging on the walls of the receptacle *v* or on its contents or both, combined with the violent agitation set up in the receptacle *v*.

It will be realised that where a main water supply is not available for connection to the pipe *c*, water under the necessary pressure could be obtained by connecting the lower end of the pipe *c* to a sealed container fitted with an air pump, or to a hand pump of the beer engine type. Again, of course, the part of the apparatus from the union *g* downwards can be attached to any ordinary domestic water tap for household use.

When plain drinking water is aerated the visible air bubbles soon disappear, although if the aerated water is examined under a powerful lens the air is seen in suspension for some time afterwards. If, however, any fruit juice, syrup, cordial, or spirit is introduced the aeration is held for a longer time according to the density and colloidal properties of the blended liquids.

In comparing the method of blending drinks in accordance with this invention with the use of soda water, it must be observed that in the latter case an alka-

Defendant's Exhibit 4248

line solution is added with a considerable amount of carbon dioxide gas which creates a gaseous effervescence. It may be stated that the effect of the soda water with whiskey is to break up the fusel oil, the particles of which become surrounded by carbon dioxide gas, thus nullifying the unpalatable oily taste. With the apparatus in accordance with the present invention, this fusel oil is also broken up, due to the penetrative force and atomising effect of the jet stream, and the particles of the oil are thereby coated with air bubbles. Thus the same physical effect is obtained as with soda water, and the peculiar and somewhat disagreeable taste is overcome. Also, the so-called "gassy" after effect does not occur, as the air in the beverage is very readily absorbed by the human system. Another valuable feature is the refreshing and invigorating effect of a purely air aerated fruit juice, cordial, syrup, or the like, on the human body, compared with soda water, which introduces an excess of chemicals as well as carbon dioxide gas, and causes an enervated condition with subsequent feeling of depression in the system. Further the bouquet and flavour of the beverages blended and aerated with the apparatus of this invention are enhanced to a very marked degree and rendered much more agreeable to the palate than if mixed with either soda water or plain water.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An apparatus for aerating a liquid and blending with it a liquid flavouring agent, wherein the latter is admitted at a controlled rate to a conduit and the liquid is forced through a nozzle so as to be formed into a sharp jet stream, to draw in air through apertures, and to impinge in that condition, upon the inflowing flavouring agent, with the result that it penetrates the latter, and breaks it up.

2. An apparatus, according to Claim 1, wherein the liquid is forced through a jet consisting of a perforation at the apex of a cone-shaped nipple arranged centrally in a pipe the walls of which are perforated to admit air at some distance in front of the aperture.

3. An apparatus according to Claim 1 or Claim 2, wherein the flavouring agent is allowed to flow at a controlled rate from a calibrated receptacle into the pipe through which the jet of liquid is caused to flow from the nozzle.

4. An apparatus according to Claim 1, 2 or 3, comprising a vertical pipe for connection to a water supply and a conical nipple clamped centrally therein with a calibrated receptacle connected to a reduced portion of the vertical pipe by means of a side pipe including a regulating tap, substantially as described.

5. An apparatus for aerating water and for blending with it a flavouring agent such as a fruit juice, syrup, essence, cordial or spirits, substantially as described with reference to the accompanying drawings.

Dated this 28th day of March, 1929.

For the Applicant:

H. A. GILL & Co.,

Chartered Patent Agents,

51/52, Chancery Lane, London, W.C. 2.

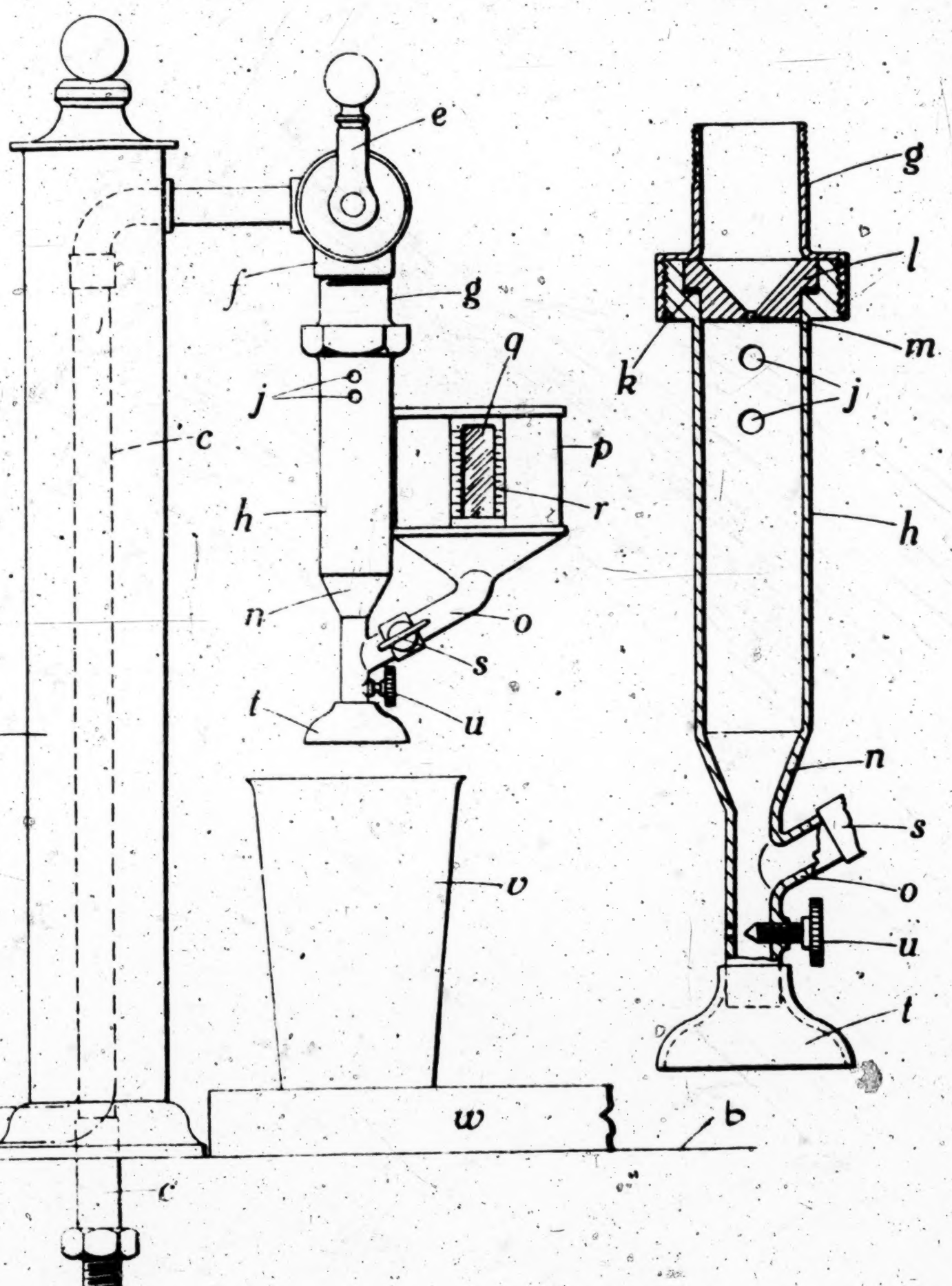
Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1930.

Defendant's Exhibit

323,242 COMPLETE SPECIFICATION 1 SHEET

Fig. 1.

Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale]

Defendant's Exhibit 44-10

2 App. 289

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PATENT SPECIFICATION

405,316

Application Date: Aug. 3, 1932. No. 21,752/32.

" " Aug. 27, 1932. No. 24,024/32.

One Complete Left: Aug. 1, 1933.

Complete Accepted: Feb. 5, 1934.

PROVISIONAL SPECIFICATION.

No. 21,752, A.D. 1932.

An Improved Device for Aerating a Liquid after it has Passed Through the Nozzle of a Tap.

I, Louis Solomon, 55, High Street, Plaistow, E. 13, London, English, do hereby declare the nature of this invention to be as follows:—

This invention relates to tap nozzles, and more especially to those used upon the spouts of beer engines and the like, and for the specific purpose of mixing air with the liquid in passing through them, and producing a foam froth or lather.

The object of the present invention is to provide a device whereby air is drawn into the liquid in its passage through the said device.

The invention consists of a cylinder of suitable length and circumference, about one half of its length being hollow and the remaining half solid. The solid portion is pierced with a number of longitudinal holes half of which are bored from the inside and are blind, that is they are not bored through, and the others are bored from the outside end and taken right through. The blind holes that are drilled from the inside are now connected with holes bored through the sides of the cylinder to allow of the ingress of the air. About half way down in the hollow portion a number of pegs are inserted through the wall of the cylinder, of a suitable length, the points of the said pegs converging on to the centre of the cylinder and being placed directly in line with the said longitudinal holes that are bored right through.

In operating the device the liquid passes through the set of holes that are bored right through, each stream being broken upon a point, or end, of the projecting peg, so that turbulent flow is assured, and the liquid is thereby mixed with the air that is drawn in through the other set of holes, which have their inlets from the circumferential wall of the cylinder, and consequently the liquid and air are thoroughly mixed before emerging from the open end of the device.

Dated the 3rd day of August, 1932.

LOUIS SOLOMON.

PROVISIONAL SPECIFICATION.

No. 24,024, A.D. 1932.

An Improved Device for Aerating a Liquid after it has Passed Through the Nozzle of a Tap.

I, Louis Solomon, of 55, High Street, Plaistow, London, E. 13, English, do hereby declare the nature of this invention to be as follows:—

The invention relates to taps, more especially the taps used on beer engines, and to a device by means of which air may be drawn into the device for the purposes of aerating liquids passing through the device and producing a foam or froth.

The invention is cognate to or a modification of the invention described in the Provisional Specification of my Application for Letters Patent No. 21,752 dated August 3rd 1932.

The invention described in said Provisional Specification consists of a device adapted to be connected by a length of rubber tubing to the nozzle of a tap or the like. This device is constructed of a cylinder of suitable length and diameter about one half of which, the lower half, is hollow whilst the remainder or upper part of the cylinder is solid. Said solid part is provided with a suitable number of longitudinally disposed passages one

half of which passages are bored from the interior of the cylinder and are blind at their upper ends, that is to say terminate short of the upper end of the cylinder, whilst the other passages, which are alternately disposed with respect to said first mentioned passages, extend from end to end of the solid part of the cylinder. Short passages communicating with the inner parts of said blind passages are drilled in the sides of the cylinder to allow air to pass into said blind passages. The walls or sides of the lower or hollow part of the cylinder are further provided at a suitable distance below the upper solid part of the cylinder with holes into which are driven pegs of suitable length which converge towards the centre line or axis of the cylinder and are transversely disposed with respect to the passages that extend from end to end of the solid part of the cylinder, and serve as a means for breaking up the liquid as it emerges from the lower ends of said passages.

The device operates as follows:—

When a tap provided with the device is opened liquid will flow through the set of passages that extend from end to end of the solid part of the cylinder and will impinge on the transversely disposed pegs of the device causing turbulence of the liquid. At the same time air will be drawn through the other set of passages provided in the solid part of the cylinder of the device and become mixed with the liquid.

According to the present invention the device, especially when it is intended to be used with the spouts of the taps of beer engines, is provided with means for preventing dripping. Said means may be located in either the upper part of the device or in any other part of the device. When located in the upper part of the device the solid part of the cylinder of the device may be formed with a cylinder open at its upper end in which works a floating piston that is constantly pressed by means of a light coiled spring against the lower surface of a plate which is secured in the upper end of the device and is formed at its centre with a hole of lesser diameter than said piston, whilst throughways for the passage of liquid through the device are formed in the sides of the cylinder in which said piston works, passage of liquid through said throughways obtaining as soon as the liquid passing through the nozzle of a tap provided with the device impinges on to and depresses said piston, and dripping from the device being prevented when said coiled spring by reason of lack of pressure of liquid on the top of said piston is free to press said piston against the lower surface of the plate secured to the upper end of the device. Alternatively drip preventing means for use with the device of the present invention may be located intermediate the ends of the cylinder of the device. In this case the drip preventing device may consist of a disc which is adapted to co-operate with a seating formed in the interior of the lower or hollow part of the cylinder of the device and is connected by means of a rod to a piston that works in a cylinder provided in the solid or upper part of the cylinder of the device. Said piston is constantly pressed upwards by means of a light spring interposed between the lower surface of the piston and the bottom of the cylinder in which the piston works. A drip preventing device for use with the device of the present invention may be constructed in other ways than those described above which are merely given by way of example.

Dated the 27th day of August, 1932.

C. F. ENNIS,
Registered Patent Agent,
Jessel Chambers, 88, Chancery Lane,
W.C. 2.
For the Applicant.

COMPLETE SPECIFICATION.

An Improved Device for Aerating a Liquid after it has Passed Through the Nozzle of a Tap.

I, Louis Solomon, of 55, High Street, Plaistow, London, E. 13, English, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to a device, adapted to be connected to the nozzles of taps, particularly the nozzles of beer taps and the nozzles of beer engines, by means of which liquid after it has passed through a nozzle will be aerated and a foam or froth produced.

The device, which is adapted to be connected by a length of rubber tubing to the nozzle with which it is to be used, is constructed of a cylinder of suitable length and diameter about one half of which, the lower half, is hollow, whilst the re-

mainder or upper part of the cylinder is solid. Said solid part is provided with a suitable number of longitudinally disposed passages. One half of these passages serve as throughways for the liquid and extend from end to end of the solid part of the cylinder. The other half of the passages, which are alternately disposed with respect to said first mentioned passages, extend only part of the way upwards through the solid part of the cylinder and communicate at their upper ends with the atmosphere in order that air may be drawn into the cylinder as the liquid passes through the latter. These last mentioned passages may consist of passages which are drilled from the interior of the cylinder and are blind at their upper ends, that is to say terminate short of the upper end of the solid part of the cylinder, and of short passages which are drilled in the sides of the cylinder and communicate at their inner ends with the inner ends of said blind passages, or may consist of single passages drilled at a suitable angle to the axis of the cylinder and communicating at their upper ends with the atmosphere and at their lower ends with the lower hollow part of the cylinder. The walls or sides of the lower or hollow part of the cylinder are provided at a suitable distance below the upper solid part of the cylinder with holes into which are driven pegs of suitable length which converge towards the centre or axis of the cylinder and are transversely disposed with respect to the passages that extend from end to end of the solid part of the cylinder, and serve as a means for breaking up the liquid as it emerges from the lower ends of said passages.

A device constructed as above described may when it is to be used with the nozzles of beer engines, be provided with means for preventing dripping of liquid when the device is not in use. Such drip preventing means may be of the constructions hereinafter described or of any other suitable construction.

The passages above referred to as extending from end to end of the upper solid part of the cylinder of the device may, so long as they constitute in conjunction with the remainder of the upper part of the cylinder throughways for the passage of liquid, extend only partially through the upper part of the cylinder. Examples of such shorter passages may obtain when, as aforesaid, the device of the present invention is provided with means for preventing dripping of liquid.

The invention is illustrated by the accompanying drawings.

Figs. 1 to 5 illustrate the device as it may be constructed when it is to be used with the tap of a beer barrel, Fig. 1 being an outer view of the device, Figs. 2 and 3 vertical sections of the device taken through the centres of two of the passages through which air is drawn into the device and through the centres of two of the passages for the liquid, and Figs. 4 and 5 a plan and an inverted plan of the device.

Figs. 6 to 11 and Figs. 12 to 17 illustrate two embodiments of the device as it may be constructed when the device is to be used with nozzles of beer engines, the device being then provided with means for preventing dripping of liquid. Of these figures, Fig. 6 is an outer view of the first of these devices, Figs. 7 and 8 are vertical sections taken through the centres of two of the passages through which air is drawn into the device and through the centres of two of the passages for the liquid. Figs. 9 and 10 are a plan and an inverted plan of the same device, and Fig. 11 is a further plan of the device, the disc at the upper end of the device, the piston of the means for preventing dripping of liquid and the spring acting on said piston being removed. Fig. 12 is an exterior view, Figs. 13 and 14 are vertical sections, and Figs. 15, 16 and 17 are plans, corresponding to Figs. 6, 7 and 8 and Figs. 9, 10 and 11 respectively, illustrating the second of the devices above referred to as being provided with means for preventing dripping of liquid.

Referring first to the construction of device illustrated by Figs. 1 to 5, 1 is the cylinder of the device, 2 is the upper solid part of the cylinder 1, and 3 is the lower hollow part of the cylinder. 4 are passages which extend from end to end of the solid part of the cylinder 1, whilst 5 are passages which are disposed alternately with the passages 4 and terminate short of the top of the solid part 2 of the cylinder. 6 are short passages drilled in the sides of the cylinder 1 so as to communicate with the upper ends of the passages 5, and thereby allow air to pass into the passages 5. 7 are holes in the sides of the hollow part 3 of the cylinder 1 into which are driven pegs 8 which converge towards the centre or axis of the cylinder 1 and are transversely disposed with respect to the passages 4, and serve as a means for breaking up liquid after it has emerged from the lower ends of these passages. 9 indicates part of a length of rubber tubing by which the device may be attached to the nozzle of a beer tap.

The device operates as follows:—

When a tap provided with the device is opened liquid will flow through the set of passages 4 that extend from end to end of

the solid part 2 of the cylinder 1 and will impinge on the transversely disposed pegs 8, causing turbulence of the liquid. At the same time air will be drawn through the other set of passages 5 and become mixed with the liquid, thereby aerating same and causing a foam or froth to be formed on the upper part of the liquid when the latter is drawn off into a glass or vessel placed below the device.

As previously mentioned a device constructed as above described may be provided with means for preventing dripping of liquid from the device when the latter is not in use.

Said means may consist of the additional parts illustrated in Figs. 7 and 8 and now to be described. As shown in these figures the upper solid part 2 of the cylinder 1 of the device may be formed with a cylinder 10 open at its upper end in which works a floating piston 11 that is constantly pressed by means of a light coiled spring 12 against the lower surface of a disc 13 which is removably secured in the top of the cylinder 1 of the device, by being sprung into position, and is formed at its centre with a hole 14 of lesser diameter than the piston 11, whilst throughways 15, corresponding to the through passages 4 of the device illustrated by Figs. 1 to 5, are formed at the sides of the cylinder 10 in which the piston 11 works. With this construction and arrangement of parts passage of liquid through the throughways 15 will obtain as soon as the liquid passing through the nozzle of a tap provided with the device impinges on and depresses the piston 11, dripping from the device being prevented when the coiled spring 12 by reason of lack of pressure on the top of the piston 11 is free to press the latter against the lower surface of the disc 13.

Referring now to the somewhat modified construction and arrangement of parts for preventing drip illustrated by Figs. 13 and 14, the piston 11, instead of working in and being guided by a cylinder formed in the upper part of the device, may be secured to a rod or spindle 16 which is supported at its lower end in a guide 17 formed in a diaphragm 18 that constitutes the bottom of the upper part 2 of the cylinder 1 of the device and is formed with throughways 19 for the passage of the liquid. The upper part 2 of the device is either fitted with a disc, similar in all respects to the disc 13 shown in Figs. 7 and 9, or with a plug 20 of the construction shown in Figs. 13 and 14, that is to say a plug which is made hollow for the greater part of its length, snugly fits a bore 21 formed in the upper part 2 of the cylinder 1, is provided at its centre with a hole 22 of lesser diameter than the piston 11, and is formed with a shoulder 23 adapted to bear, when the plug is pushed home, against the top of the cylinder 1 of the device. The light coiled spring 24 by which the piston 11 is pressed upwards against the top of the hollow part of the plug 20, or against the lower surface of the equivalent disc, if such be used, is interposed between the lower surface of the piston 11 and a washer 25 which bears against the diaphragm 18 and serves as an additional guide for the rod or spindle 16. For the purpose of preventing the coiled spring 24 and the washer 25 from becoming detached from the rod or spindle 16 when the piston rod and spring are removed from the device for the purpose of cleaning the lower part of the rod 16 is, as shown, made of greater diameter than the rest of the rod so as to provide a shoulder 26 against which the washer 25 will bear when said parts are removed. The drip preventing device just described acts in the same way as the drip preventing device illustrated by Figs. 7 and 8.

Means for preventing dripping of liquid for use with the aerating device of the present invention may, so long as it consists of a valve adapted to be normally pressed by a spring against a seating but to be depressed by the passage of liquid through the device, be constructed in other ways than those described above, which are merely given by way of example.

If desired the passages through which air is drawn into the device, instead of being formed of two parts, 5, 6, disposed at right angles to one another, may consist of single passages drilled at a suitable angle to the axis of the cylinder of the device and communicating at their upper ends with the atmosphere and at their lower ends with the lower hollow part 3 of the cylinder.

For the purpose of preventing an objectionable flavour being imparted to a liquid in its passage through the aerating device the latter is preferably constructed of ebonite, whilst the springs used in the anti-dripping devices are made of silver wire.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be carried out I declare that what I claim is:—

1. An improved device for aerating a liquid, after it has passed through the nozzle of a tap, consisting of a cylinder adapted to be connected to the nozzle by a length of rubber tubing and comprising a lower hollow part and a relatively solid

405,316 COMPLETE SPECIFICATION

SHEET 1

[This Drawing is a reproduction of the Original on a reduced scale.]

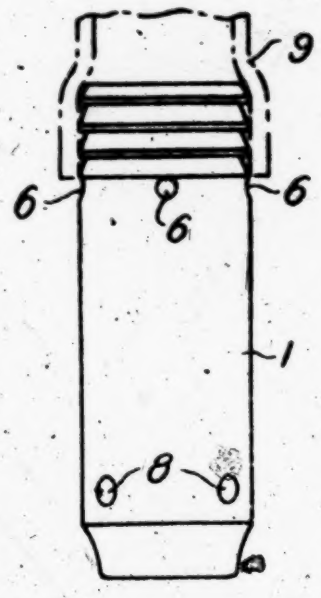


FIG. 1.

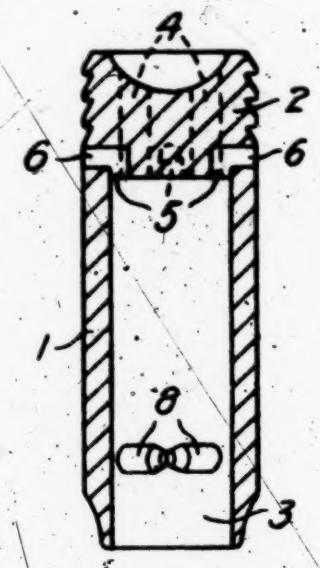


FIG. 2.

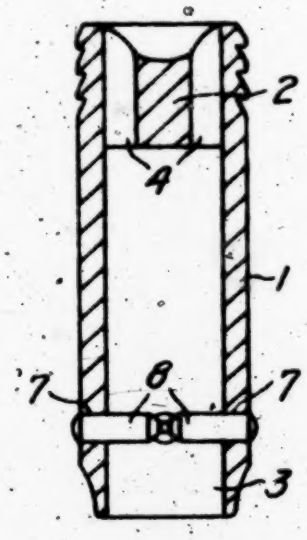


FIG. 3.

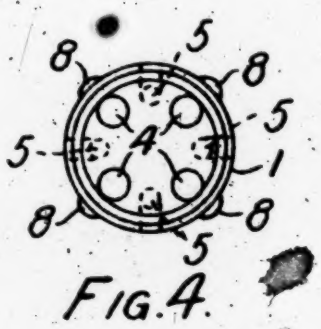


FIG. 4.

FIG. 5.

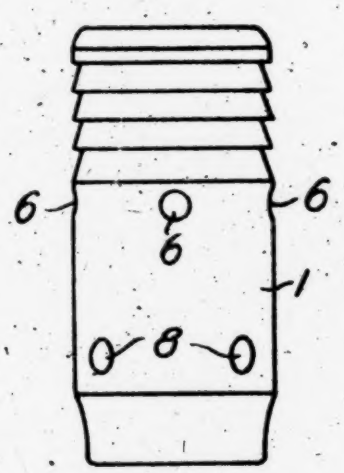


FIG. 6.

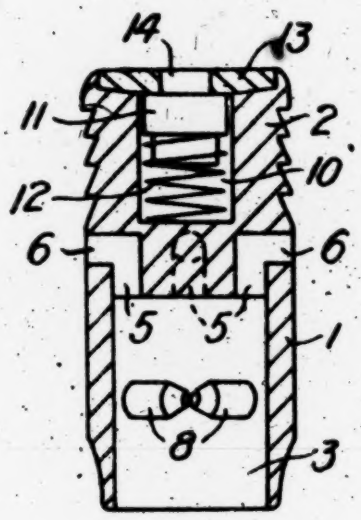


FIG. 7.

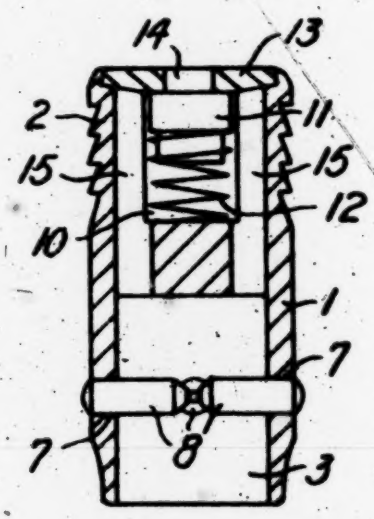


FIG. 8.

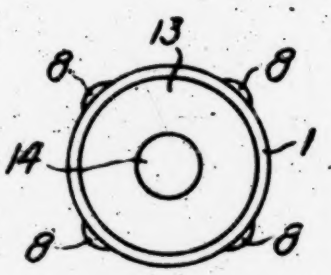


FIG. 9.

FIG. 10.

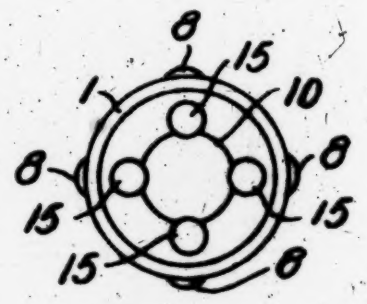


FIG. 11.

Defendant's Exhibit 44-10

2 App. 295

2 SHEETS

SHEET 2

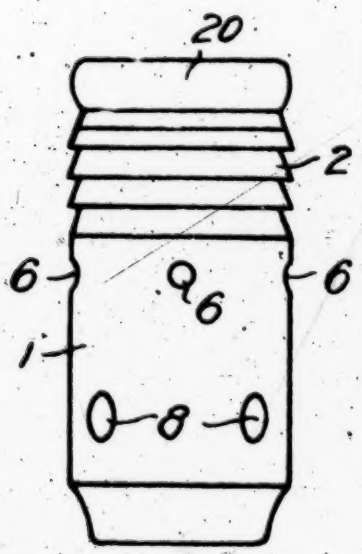


FIG. 12.

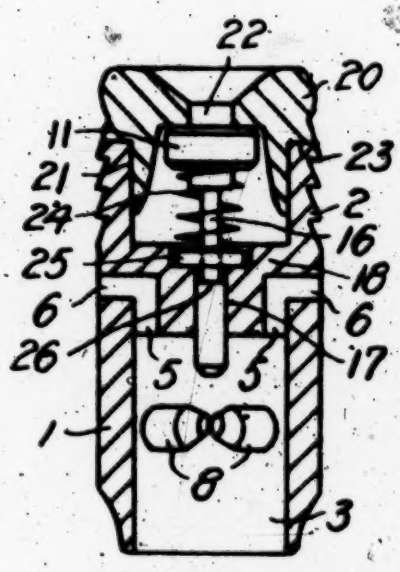


FIG. 13.

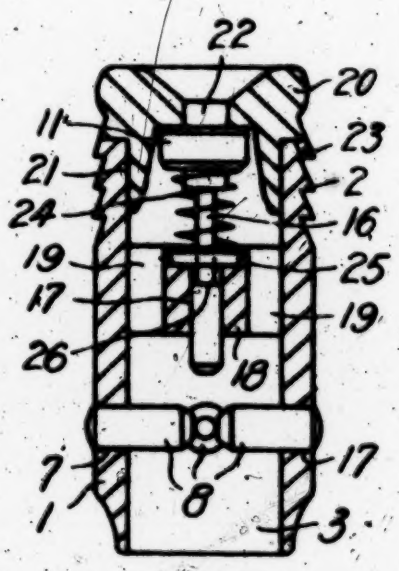


FIG. 14.

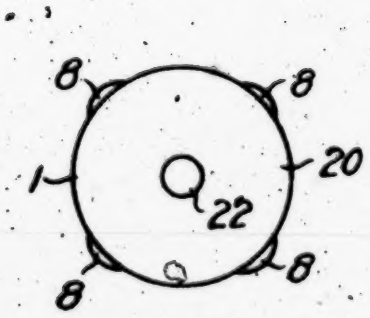


FIG. 15.

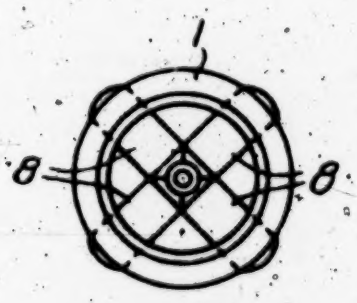


FIG. 16.

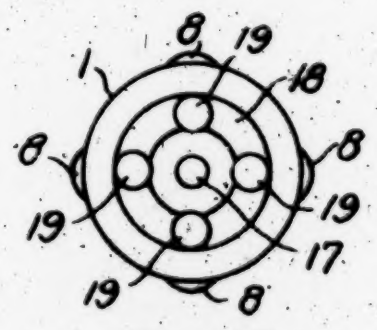


FIG. 17.

Malby & Sons, Photo-Litho

upper part, passages in said relatively solid part serving as throughways for the liquid, passages, alternating with said throughways, which extend only partly through said relatively solid upper part and communicate at their outer ends with the atmosphere, and pegs supported by the hollow part of the cylinder of the device in positions below and transverse to said throughways, substantially as described.

2. A device according to Claim 1 which is provided with means for preventing dripping of liquid, substantially as described.

3. A device according to Claim 2 in which the means for preventing dripping of liquid consists of a piston which works in a cylinder or space provided in the relatively solid upper part of the cylinder of the device and is constantly pressed by means of a light coiled spring against a disc or a plug that is located in the upper end of the cylinder of the device and is provided at its centre with a hole of lesser diameter than said piston, substantially as described.

Dated this 31st day of July, 1933.

C. F. ENNIS,
Jessel Chambers, 88, Chancery Lane,
London, W.C. 2,
Agent for the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1934.

(Page 296 in Issue)

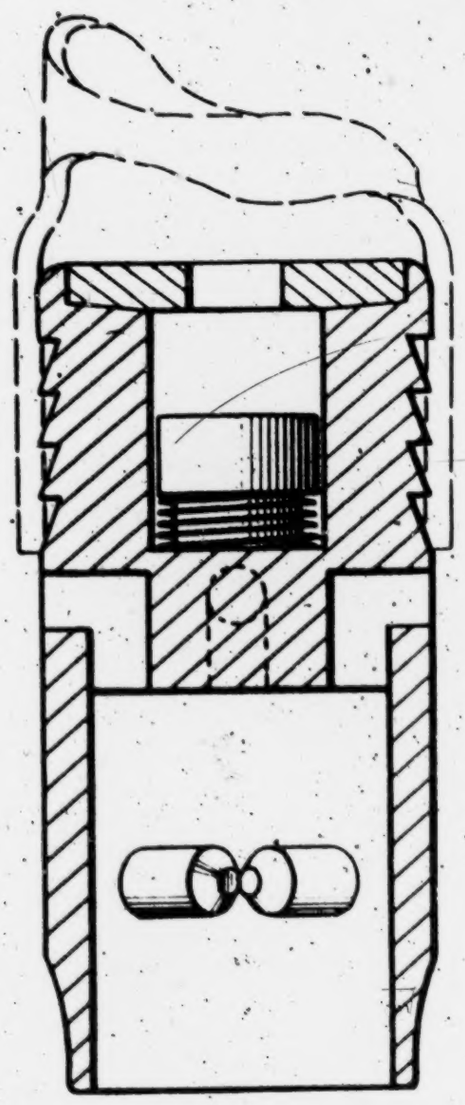


FIG. A

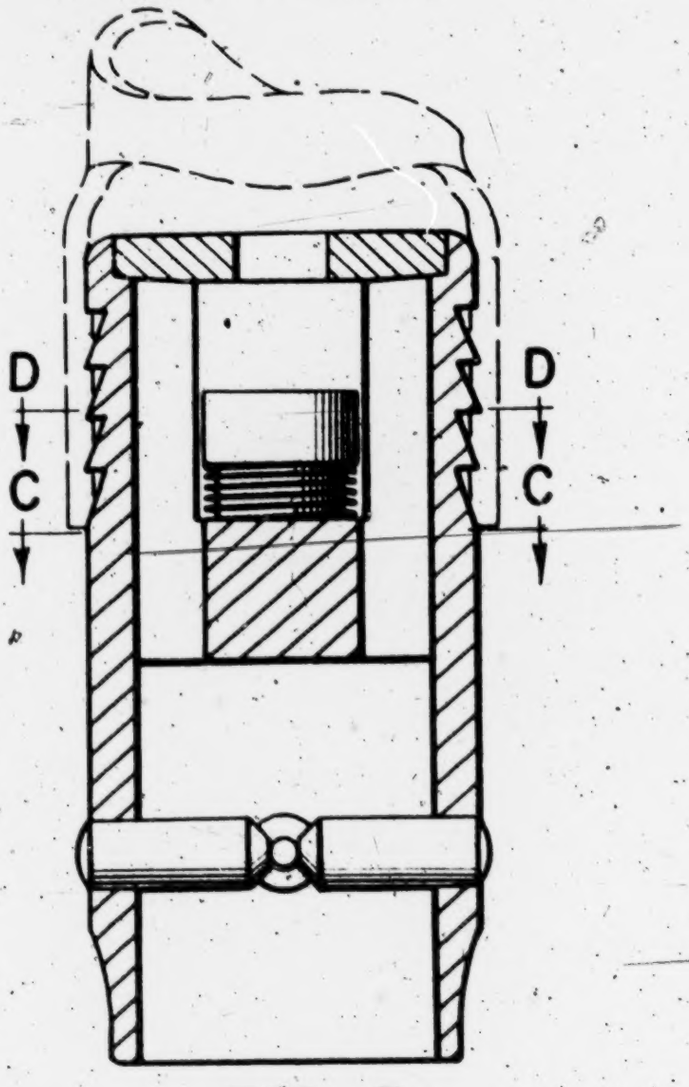


FIG. B

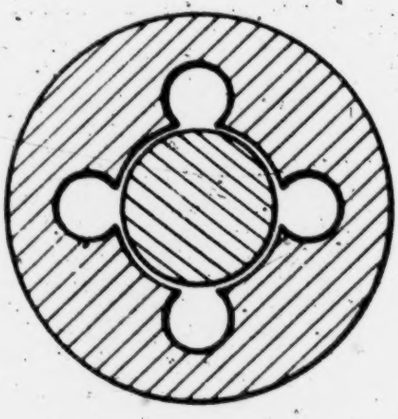


FIG. D

SOLOMON'S FIGURES 7 & 8
AND SECTIONS THEREOF

Exemplitive Drawing Of Solomon's Figures 7 & 8, And Of Sections C. And D Thereof, With Valve Member Depressed, As It Would Be When Liquid Is Flowing Through Aerator.

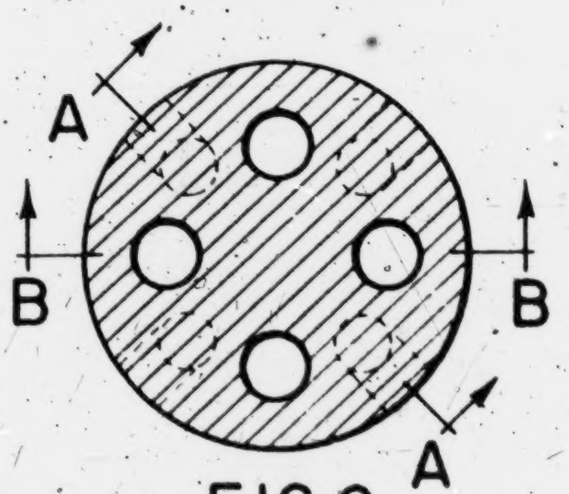


FIG.C

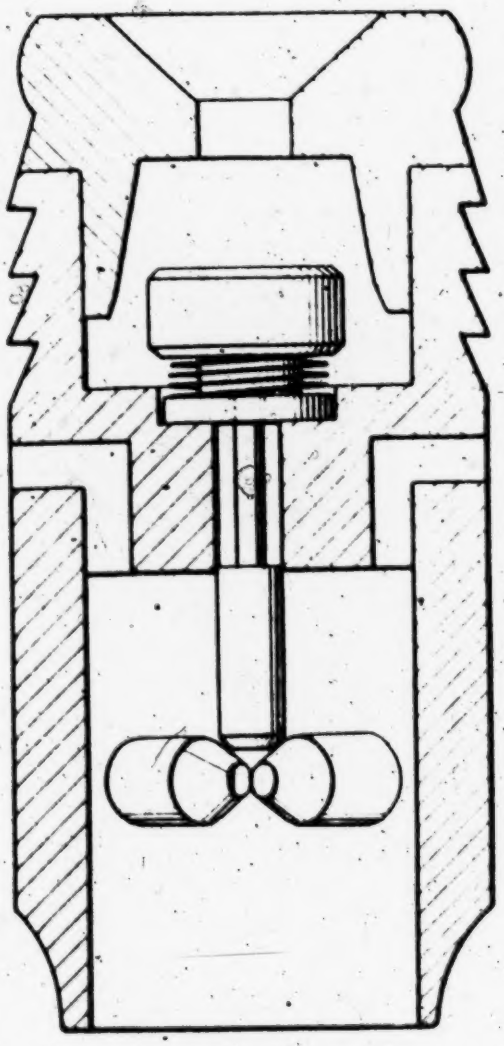


FIG. 13

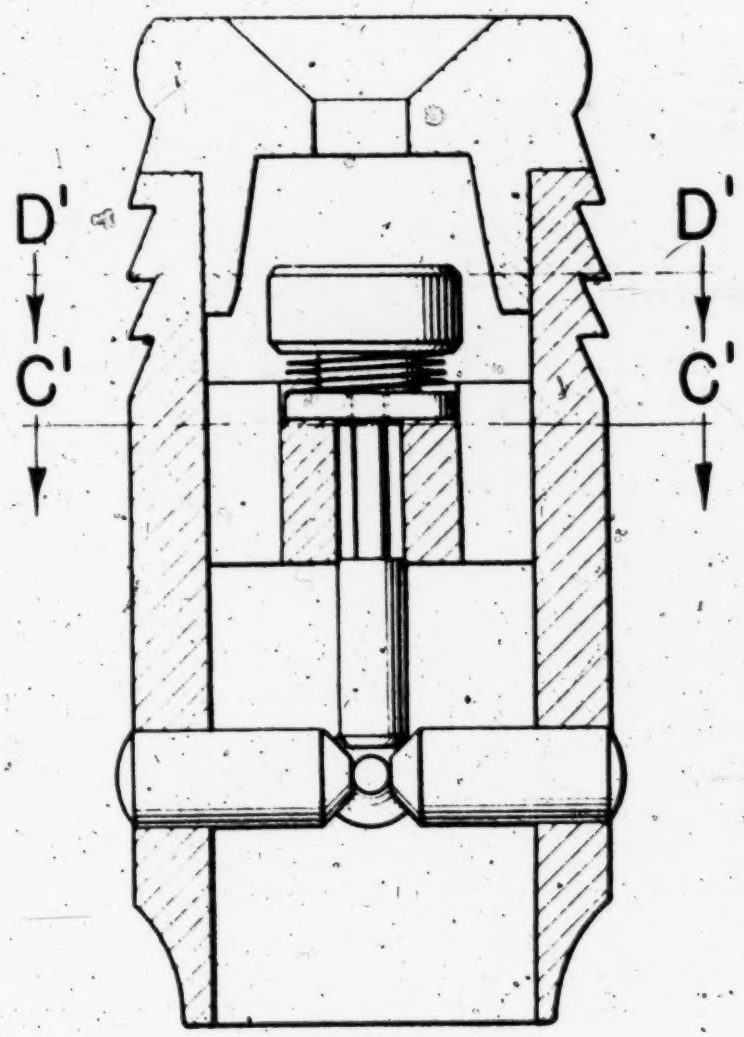


FIG. 14

SOLOMON'S FIGURES 13 & 14
AND SECTIONS THEREOF

Exemplitive Drawing Of Solomon's Figures 13 & 14, And Of Sections C' And D' Thereof, With Valve Member Depressed, As It Would Be When Liquid Is Flowing Through Aerator.

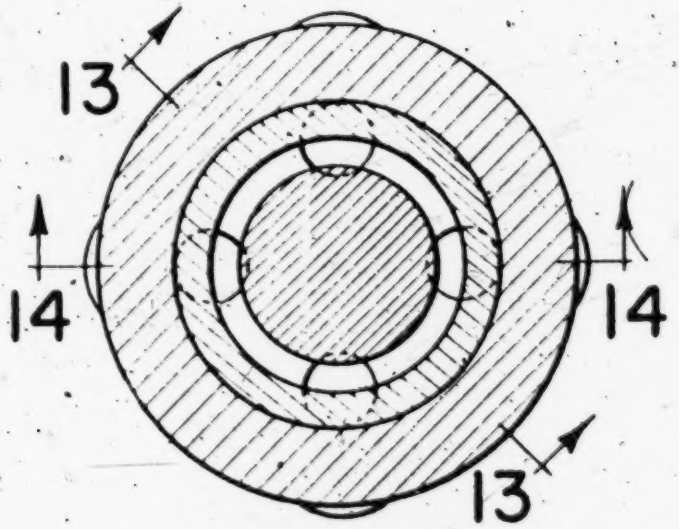


FIG. D'

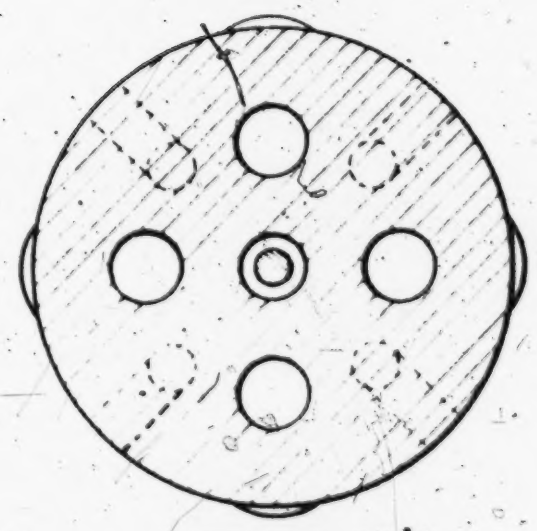


FIG. C'

Defendant's Exhibit 44-11 2 App. 299

M. FUSS.

SYSTEM FOR TREATING LIQUIDS WITH OZONE.

APPLICATION FILED APR. 9, 1909.

1,090,044. Patented Mar. 10, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

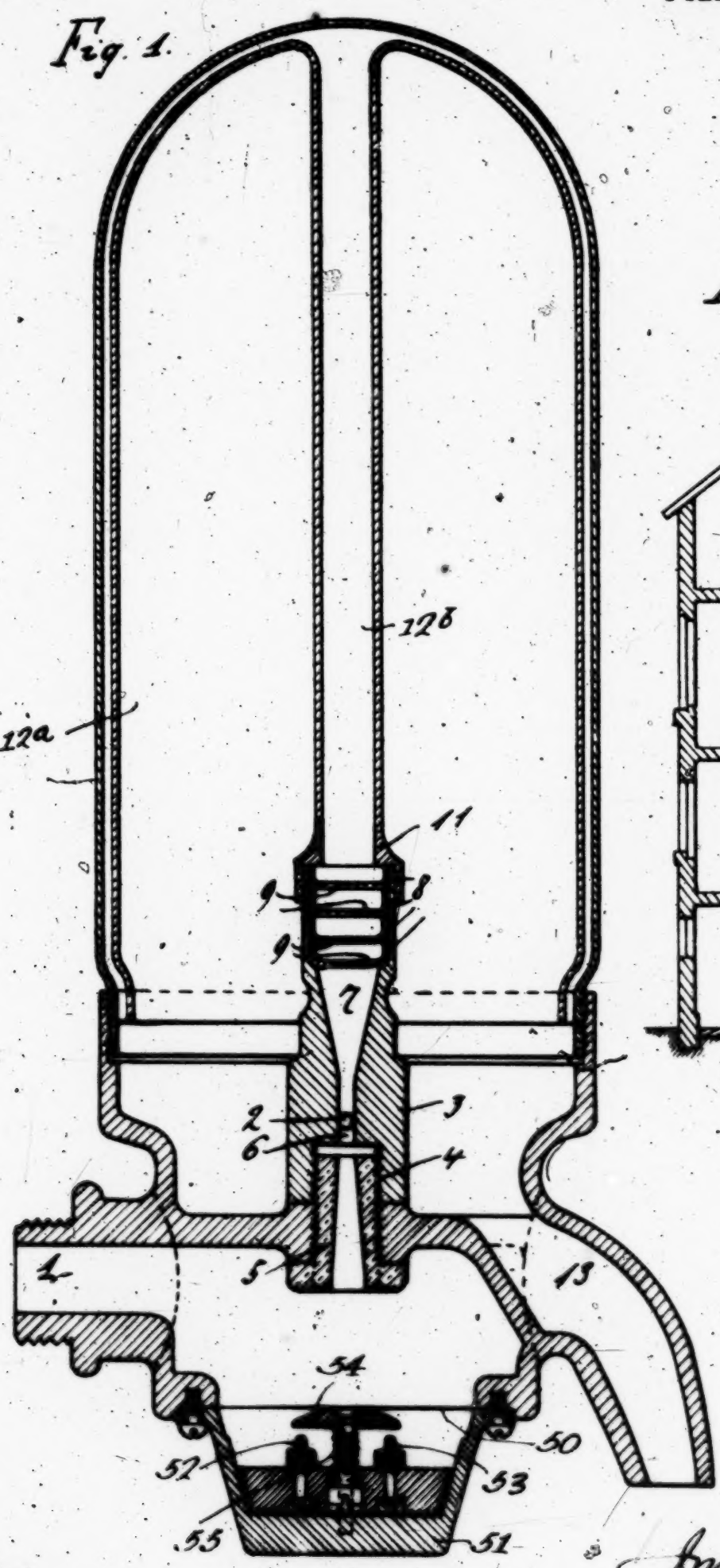
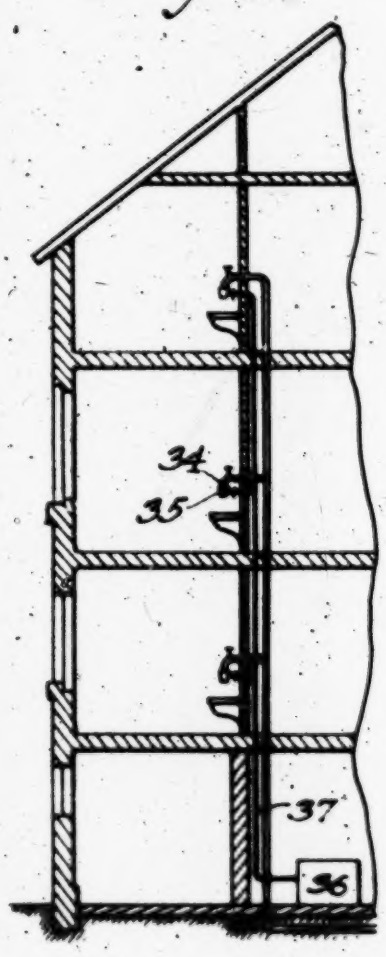


Fig. 8.



Witnesses:
J. J. McCarthy
M. G. Crandell

Inventor:
Max Fuss
by Foster Freeman Watson & Coit
Attorneys

Defendant's Exhibit 44-11

UNITED STATES PATENT OFFICE

MAX FUSS, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SYSTEM FOR TREATING LIQUIDS WITH OZONE.

1,090,044. Specification of Letters Patent. Patented Mar. 10, 1914.

Application filed April 9, 1909. Serial No. 488,001.

To all whom it may concern:

Be it known that I, MAX FUSS, a subject of the German Emperor, and a resident of Frankfort-on-the-Main, Germany, have invented certain new and useful Improvements in Systems for Treating Liquids with Ozone, of which the following is a specification.

This invention relates to improvements in systems for treating liquids with ozone for the purpose of oxidation and destruction of germs, and the object of the improvements is to provide a system by means of which such oxidation and destruction of germs takes place in a particularly effective way. As is well known, in systems of this class heretofore in use the effect of the ozone on the liquid was not sufficient for all purposes, because generally not all the germs were destroyed. The reason for the inefficiency of the systems appears to reside in the fact, that the liquid to be treated with ozone is generally brought in contact with the ozone when flowing in a single jet, so that not all of its particles come in thorough contact with the ozone.

This invention consists in providing a system, in which the liquid when treated with the ozone is so distributed as to present a large surface to the ozone, for which purpose it is discharged in thin jets or in the form of fine drops.

For the purpose of explaining the invention a system embodying the same has been shown in the accompanying drawings, in which—

Figure 1, is a vertical section of an apparatus for treating liquid with ozone, Fig. 2, is a cross-section of a portion of Fig. 1 showing the apparatus for distributing the liquid in a fine jet and for mixing ozone therewith, Figs. 3 to 5 are respectively plans and a side view of one member of the distributing apparatus shown in Fig. 2, Fig. 6 is a side elevation, partly in section, of an apparatus embodying the invention and differing slightly from the form shown in Fig. 1; Fig. 7, is a front view of the ozonizer or apparatus for generating the ozone required in the process, and Fig. 8, is a side view of a system comprising a plurality of apparatus for mixing the ozone with liquid connected to a single source of ozone.

In the example of the system for treating a liquid with ozone illustrated in the drawings, the apparatus for mixing the ozone and liquid is provided with a tubular plug 1, whereby it can be connected to a suitable water supply, for example to a faucet of the water system of a building. From the said plug, the liquid passes through a suitable mixing apparatus, in which it is divided into fine streams. Into the said mixing apparatus the ozone is drawn through apertures 2 by the suction of the stream of liquid. As appears more clearly from Fig. 2, the mixing apparatus consists of a tube 3 having a transverse opening adapted to act as an injector or an ejector. The tube has screwthreaded engagement with a tubular plug 5 through which the liquid is admitted to the mixing apparatus. The liquid passes through the bore 6 of the tube 3 and draws in the ozone through the opening 2, and it flows with the same into the conical part 7 of the bore of the stud 3, the walls of which flare outwardly beyond the opening 2, so that the ozone is drawn in by the liquid, a partial vacuum being created within the suction duct 2.

Within the upper part of the chamber 7, in the form illustrated in Fig. 1, a plurality of superimposed perforated cup shaped disks 8 are located. The disks are provided with perforations 9, which, when the disks are assembled in the chamber 7, are off-set from each other, and the disks are held in place by teeth 10 provided on upwardly projecting flanges of said disks and engaging in notches 9 of the adjacent disks. The plates are secured in place by means of a cap nut 11.

As the liquid passes through the opening 9 in the disk 8, it is divided into a plurality of jets and is several times deflected from its course, so that it passes through the chamber filled with ozone in a state of fine distribution, whereby it is thoroughly mixed with the ozone.

In order to keep the liquid as long as possible in contact with the ozone, so that the ozone is entirely absorbed by the liquid, the liquid is not directly discharged into the atmosphere, after being mixed with the ozone in the chamber 7 in the manner described, but into a receptacle 12 located above the mixing apparatus. The said receptacle is so constructed, that the jet of liquid, by being thrown against the wall of the receptacle, is formed into a thin layer

Note

Page 300 is blank;
Page 301 is on Card 20;
Page 302 is blank.

Defendant's Exhibit 44-11

or into fine drops flowing down the wall of the receptacle and through an atmosphere of ozone before it is discharged through the spout 13.

As shown the receptacle 12 is provided with an inner shell 12^a, having a central tube 12^b which communicates with the nozzle member 11. By this arrangement of parts the liquid is caused to travel in a thin sheet or series of thin drops through the relatively narrow space separating the outer wall of the casing 12 and the inner shell 12^a thereof.

The ozonizer or apparatus for generating the ozone which is preferably used in the improved system consists of plates forming electrodes and dielectric plates or disks interposed between said electrodes. The said apparatus is thrown into operation by means of a switch controlled by the pressure of the liquid to be subjected to the influence of the ozone. In the embodiment of the invention illustrated in Fig. 1 such switch is located below the mixing device hereinbefore described and comprises a diaphragm 50 clamped between the main casting or body of the device and a depending support 51. On said support are suitably mounted terminals 52, 53 of an electric circuit, and above these is arranged a circuit closing plate 54 which is maintained in contact with the diaphragm by action of a spring 55. When liquid is not passing through the supply duct the spring 55 acts to lift the circuit closer 54 and diaphragm 50 into the position shown in the drawing, in which said plate is out of contact with the terminals 52, 53. The pressure of liquid passing through the device, however, will operate to depress the diaphragm and circuit closer to set in operation the apparatus for generating ozone which will be conducted to the mixing device through the duct 2, as previously described. In the preferred form of the system, however, the electrical apparatus of the ozonizer is entirely separated from the conduit for the liquid, so that the electrical apparatus can not be injured by the liquid, and the mixing apparatus can not be charged with electricity. For this purpose, the switch is located on the ozonizer or within the casing of the same, so that the electrical part of the system is entirely separated from the mixer. The connection between the switch and the liquid is made by a tube transmitting the vacuum created by the liquid to the switch controlling device and serving at the same time as a duct for the ozone from the ozonizer into the mixing apparatus. An example of this part of my invention is shown in Figs. 6 and 7. The ozonizer is inclosed within a casing 14. The duct for transmitting the ozone to the mixing apparatus consists of channels 15, 16, 17 and a tube 18. Between the channels 16 and 17 a valve 19 is located which is normally pressed by a spring 20 against its seat, while it bears with its upper surface against a diaphragm 21. The valve is made with ports 23 and 24 and with openings 25 located perpendicularly to the latter. On the upper surface of the diaphragm a spring arm is supported which at its free end holds a contact 26 above a contact 27. The duct 15, 16, 17, and 18 communicates with the ejector 3, 11 which in the example illustrated is located at the discharge side of the faucet 28.

In the embodiment of the invention illustrated in Fig. 6, the chamber 12 of the form shown in Fig. 1 is omitted, and the mixing tube opens downward, or in the direction represented in Fig. 2.

The operation of the apparatus is as follows: When the valve on the faucet 28 is opened, the jet of liquid passing through the ejector 3, 11 creates a partial vacuum within the suction ducts 18 and 17. Therefore the atmospheric pressure on the diaphragm 21 causes the valve 19 to be moved from its seat against the action of the spring 20, so that the port 23 is brought into communication with the duct 16. Thereby the sections 15 and 16 of the suction duct communicate with the sections 17 and 18, and the contacts 26 and 27 are closed, so that the apparatus for producing the ozone is thrown into operation. If now for any reason after opening the valve on the faucet 28 the pressure within the suction duct 15, 16, 17, and 18 be not decreased as before described but increased, and if part of the liquid be forced through said duct and toward the ozonizer, the valve 19 is pressed on its seat not only by the spring 10 but by the pressure of the liquid within the suction duct, so that the ozonizer is shut off from the liquid supply.

In the apparatus for producing ozone just described, in which plain disk electrodes and interposed dielectric plates are used, the discharge of the electricity takes place without interruptions and in the form of layers. In apparatus of this class it is difficult to hold the plates at the proper distances from one another, without unduly choking the passage of the air to be transformed into ozone, and to decrease the fields of the discharge. Therefore the metallic plates and the dielectric plates are held in their proper relation by means of small projections on the said plates.

By the construction of the switch and its controlling devices so far described and illustrated in Figs. 6 and 7 of the drawings the liquid is entirely separated from the ozonizer and its electrical apparatus. As appears from Fig. 8, the same ozonizer can be provided for a plurality of mixing devices. As shown in the said figure, each of the faucets 34 is provided with a mixing ap-

N° 12,345 A.D. 1898

Date of Application, 1st June, 1898

Complete Specification Left, 25th Feb., 1899—Accepted, 1st June, 1899

PROVISIONAL SPECIFICATION.

An Improved Attachment for Cocks and the like for Ensuring an Even Flow of the Liquid therefrom.

I, WATRIN VIELHARD, of 63, Rue Mazel, Verdun (Meuse), in the Republic of France, Ironmonger, do hereby declare the nature of this invention to be as follows:—

This invention relates to a small appliance which I term a "jet-breaker" and which may be adapted to cocks or nozzles for the flow of water or other liquids, for the purpose of regulating the flow and more particularly for preventing the liquid from splashing.

This appliance consists essentially of a small box made in two parts which are united; in this box are arranged one or more perforated metal sheets. The box is connected on one side to the nose of the cock or nozzle either directly by screwing, brazing or soldering, or by means of an india-rubber tube.

The liquid, flowing under pressure or simply owing to its weight, traverses the metal sheet or sheets, where it is filtered and broken up so to speak, and then flows out in the form of a regular column which does not splash.

In applying my device to the nozzle of a cock by soldering brazing or by other suitable means, the body of the device is made in two parts which are screwed one upon the other, the upper part terminating in a tube which is intended to surround the nozzle of the cock, whilst the lower part or grating terminates in a more or less conical nozzle or adjutage and is provided with a shoulder upon which rest one or more perforated metal sheets or plates which are forced into the device.

In order to clean or remove the perforated metal sheets, it is only necessary to unscrew the lower part of the device which is provided with an external milled band for this purpose.

The water under pressure issuing from the cock fills the chamber formed by uniting the said two parts, passes through the metal sheets where it is filtered and where the jet is broken up, it then passes out in a regular column and falls without causing any splashing.

When the device is adapted to be removably connected with the cock by means of an india rubber tube it acts in precisely the same manner.

The perforated sheets may be equally well cleaned or removed in this case also.

The grating may be screwed upon the upper part, but the perforated metal sheets are set in this grating. The said sheets may however be cleaned when desired as also the whole of the jet-breaker.

Dated this 1st day of June 1898.

HASELTINE, LAKE & Co.,
45, Southampton Buildings, London, W.C., Agents for the Applicant.

[*Price 8d.*]

N° 12,345.—A.D. 1898.

Attachment for Cocks &c., for Ensuring an Even Flow of the Liquid therefrom.

COMPLETE SPECIFICATION.

An Improved Attachment for Cocks and the like for Ensuring an Even Flow of the Liquid therefrom.

I, WATRIN VEILLARD, of 63, Rue Mazel, Verdun (Meuse), in the Republic of France, Ironmonger, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a small appliance which I term a "jet-breaker" and which may be adapted to cocks or nozzles for the flow of water or other liquids, for the purpose of regulating the flow and more particularly for preventing the liquid from splashing.

This appliance comprises essentially two parts which are united together; one of these parts is provided with one or more perforated metal sheets, and the other is connected to the nose of the cock or nozzle, either directly by pressure, screwing, brazing or soldering, or by means of an india-rubber tube.

The liquid, flowing under pressure or simply owing to its weight, traverses the metal sheet or sheets, where it is filtered and broken up so to speak, and then flows out in the form of a regular column which does not splash.

The body of the "jet-breaker" may be of any desired form and made of copper, bronze, aluminium or any other suitable metal or substance such as, glass, celluloid, composition, *etc.* but in all cases it will be made in two parts properly united together so as to allow of its easy cleaning.

In the accompanying drawing I have represented several models of my "jet-breaker," arranged the one in order to be brazed to the nose of the cock and the others to be removably connected to the cock by means of an india-rubber tube or ring.

Figs. 1 to 3 refer to the first model, Fig. 1 being a vertical section of the device, Fig. 2 a plan view, and Fig. 3 showing the "jet-breaker" adapted to a cock.

Figs. 4 and 5 represent sectional views of two other models.

Figs. 6 and 7 represent a modified construction of the "jet-breaker" and

Fig. 8 represents a fourth modified construction.

With reference to Figs. 1 to 3 it will be seen that the body of the device is made in two parts *a* and *b* which are screwed one upon the other, the upper part *a* terminating in a tube a^1 which is intended to surround the nozzle of the cock, whilst the lower part *b* or grating terminating in a more or less conical nozzle or adjutage b^1 is provided with a shoulder *c* upon which rest one or more perforated metal sheets or plates *d d* which are forced into the device.

In order to clean or remove the perforated metal sheets, it is only necessary to unscrew the lower part *b* of the device which is provided with an external milled band *f* for this purpose.

The water under pressure issuing from the cock fills the chamber *o* formed by uniting the two parts *a* and *b*, passes through the metal sheets *d* where it is filtered and where the jet is broken up, it then passes out in a regular column, and falls without causing any splashing.

In Fig. 4, similar letters refer to same parts. The device acts in precisely the same manner, but instead of being directly secured to the cock, it is connected thereto by means of an india-rubber tube *m*, the part *a* being curved outwardly to better secure the tube as shown.

The perforated sheets may be equally well cleaned or removed in this case also.

In Fig. 5 the grating *b* is also screwed upon the upper part *a*, but the perforated metal sheets are set in this grating. The said sheets may however be cleaned when desired as also the whole of the "jet-breaker."

Attachment for Cocks, &c., for Ensuring an Even Flow of the Liquid therefrom.

With reference to Figs. 6 and 7 it will be seen that the body *a* of the device is made of stamped or chased metal, formed with an interior shoulder for supporting the perforated metal discs *d*, and the second part *b* is formed by a cork or india-rubber ring adapted in the interior of the part *a* and extending up to its upper edge. This ring allows, on account of its elasticity, of its easy fixing to the nose of the cock, and ensures the tightness of the joint.

As it may be seen in Fig. 8, the second part *b* which is of india-rubber extends upwards beyond the upper edge of the part *a*, and enables the utilising of the elasticity of the india-rubber in order to adapt the device to the cocks of different diameters. In this case, in order to properly unite the parts *a* and *b*, a metallic ring *x* is placed in the lower part of the india-rubber tube, and it has a diameter large enough to ensure on the one side the adhesion of the tube and the ring and on the other side to compress the tube between said ring and the side of the part *a*. The ring *x* will be preferably split so as to act as a spring and facilitate the mounting of the device.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1.—A device termed "jet-breaker" which adapts itself to cocks or nozzles for the flow of the water or other liquids for the purpose of regulating the flow and more particularly for preventing the liquid from splashing,—this device comprising two parts which are united together, one of which is connected to the nose of the cock or nozzle and the other is provided on its inside with perforated metal sheets which the liquid jet is forced to traverse before flowing to the outside.

2.—A device according to Claim 1, of copper or other suitable metal made in two parts *a* and *b* screwed one upon the other, the part *b* having on its inside perforated metal sheets *d*, and the part *a* being brazed or soldered to the nose of the cock, substantially as hereinbefore described and illustrated by Figs. 1 to 3 of the accompanying drawing.

3.—A device according to Claim 1, with two parts *a* and *b* screwed one upon the other, the part *b* having on its inside perforated metal sheets *d* and the part *a* being curved outwardly so as to receive an india-rubber tube *m* which adapts itself on the other side to the nose of the cock, substantially as hereinbefore described and illustrated by Figs. 4 and 5 of the accompanying drawing.

4. A device according to Claim 1, with a part *a* upon an interior shoulder of which rest perforated metal sheets *d*, and a part *b* of india-rubber or cork which is forced in the inside of the part *a* so as to extend up to its upper edge and which adapts itself by mere elastic contact to the nose of the cock, substantially as hereinbefore described and illustrated by Figs. 6 and 7 of the accompanying drawing.

5.—A device according to Claim 1, with a part *a* upon an interior shoulder of which rest perforated metal sheets *d*, and a part *b* of india-rubber arranged in the inside of the part *a* and extending upwards beyond the edge of this part so as to adapt itself to the nose of a cock in the way of an ordinary india-rubber tube, in combination with a metallic split ring *x* placed in the inside of the part *b* and in its lower end in order to properly unite the parts *a* and *b* substantially as hereinbefore described and illustrated by Fig. 8 of the accompanying drawing.

Dated this 25th day of February 1899.

WHEATLEY & MACKENZIE,
10, Chancery Lane, London, W.C., Agents.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1899.

2 App. 311

[Page 310 is on Card 20]

Defendant's Exhibit 45

PATENT SPECIFICATION

625,084

Application Date: June 22, 1938. *No. 18571/38*

Complete Specification Accepted: June 22, 1949.

Index at Acceptance:—**Classes 14(i), B2e; and 86, B8b.**

COMPLETE SPECIFICATION

Improvements in and relating to Devices for Mixing Air with Water

I, ELIE AGHNIDES, a Greek Subject, of 14, Boulevard de Waterloo, Brussels, Belgium, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

In the specification of my Letters Patent No. 468,687 I have described a device for intimately mixing air with a liquid flowing under pressure, wherein an injector portion is provided, upstream of the part where it aspirates air, with a perforated cross partition that divides the stream of liquid into a number of small streams, and downstream of said part with an atomising and mixing part comprising one or more finely perforated plates. The object of the upstream perforated plate was to assist the dividing effect of the downstream perforated plate or plates, in order to obtain a fine division of the streams of fluids and a thorough mixing of both air and liquid particles.

The device according to the present invention for producing a jet of water containing air bubbles comprises an injector portion which is provided, upstream of the part where it aspirates air, with a perforated cross partition and downstream the said part with an atomising and mixing part comprising one or more finely perforated plates, the present device being characterised, however, in that the holes in the said plate or plates are so small and close together as to divide the air into particles of such size as to form small air bubbles having a tendency to remain in suspension in a jet of liquid, the holes in said plate or plates, or the number of these plates, or the outlet of the device being such as to force the liquid streamlets issuing from said holes to join together and to form at the outlet a single stream or jet. When both these conditions are fulfilled, one obtains, for instance with water and air, a single jet wherein the air bubbles are imprisoned in the water, which jet can be described as a "white" jet owing to the amount of air which is contained in the jet, this amount being appreciably greater than that contained in a jet produced by the device according to my said Patent Specification.

It has been proposed to mix a liquid with a gas by placing downstream the injector portion of the device superposed plates with big apertures in such a manner that the apertures of one plate always lie over the full portion of the next plate. In such an arrangement the resistance offered by the plates is too great and their dividing action is too small and uneven to produce a stream of the type produced by my invention. In a device of this type the amount of air entrained is small, its division insufficient, and the resulting stream feels substantially the same to the touch and appears substantially the same to the eye as an ordinary stream of water. In my device the resistance offered by the plate or plates is relatively very small, and its, or their, dividing capacity is accordingly even and great. As a result, a great volume of air is mixed with the water, the air is evenly and finely divided, and the bubbly stream produced is white and fluffy like foam and has properties never seen before.

The first condition can be met by using one or several sieves or perforated members having holes each of about 0.6 of a millimetre square, this size being however not critical.

The second condition can be met by using a sieve or perforated member as indicated wherein the holes are so near that the streamlets of water passing therethrough immediately join together. One can also use more than one such sieve, for example, several sieves, superposed or distanced from each other, whose holes are somewhat larger, combined with at least one sieve with very close holes as aforesaid. Finally one can also use one or more sieves, such as indicated or with larger distance between the holes, but arranged upstream of a constriction in the casing of the device, so as to force the streamlets to join together and thereby to form a single, not divided jet at the outlet.

Devices for atomizing and aerating liquids are known, which comprise an injector

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Defendant's Exhibit 45

portion and, downstream this injector portion, a dividing and mixing part but, in these devices, the atomizing and the aeration are mainly effected by the rotation of a plain spherical valve or body, upon which the jet of liquid under pressure impinges for putting this body in motion. These devices are somewhat complicated and costly and their application is rather limited, for instance they cannot be mounted on an ordinary water tap or faucet, and the water jet impinging on the spherical body must have a substantial pressure in order to withdraw the spherical body from its seat and put it in rotation. Further, the quantity of air passing through is rather small.

My invention can readily be understood by reference to the accompanying drawing, in which Fig. 1 is a sectional view of a device embodying my invention which is shown as attached to an ordinary water faucet through the medium of a connecting device such as is described in my Patent No. 451,142; Fig. 2 is a sectional view of a device adapted to be screwed onto an ordinary water pipe; Fig. 3 is a section on line III-III of Fig. 2; Fig. 4 is a sectional view showing a further modified form; Fig. 5 is an additional sectional view of a further modification. Fig. 6 is a sectional view of a device adapted to be connected with a flexible hose or metal tube. Fig. 7 is a section on line VII-VII of Fig. 6.

Referring now to Fig. 1, 1 designates an ordinary faucet or tap. 2 is a tap connector, the operation of which is described in detail in my patent 451,142. 4 is the casing of the mixing device enclosing the primary mixing chamber. The perforated screen 6 admits the water into the casing 4 in the form of a plurality of jets. A plurality of air ports 8 are provided for admission of air into the interior of the casing 4. 10 is a screen at the lower part of the casing, and below the screen 10 the casing narrows to form a constricted passage 12.

The screen 10 is here made of a sieve having very narrow holes for instance capillary holes or holes of about 0.6 square millimetres, these holes being so near as to force the streamlets passing therethrough to join immediately together. However, when using the constriction 12, these holes need not to be so near, such a constriction performing the joining together of the small streamlets.

When the water is turned on through this device, if the faucet is only opened slightly so that very little kinetic energy is developed in the water as it emerges from the perforations in screen 6, the water will come out of the discharge 12 in a perfectly normal manner. However, as the water pressure is increased and the velocity increases, the water emerging from the perforations of screen 6 will draw air into the chamber through the por· 8 and this water striking the screen 10 at comparatively high velocity this water and the air will be broken up and finely divided. This water will pass through the screen with the air and emerge from the outlet 12. As the diameter of outlet 12 is substantially greater than the aggregate diameter of the perforations in screen 6, the water will have relatively low velocity as it comes out from the discharge.

In the form of device shown in Fig. 2, a metal casing 14 is screwed directly onto the faucet 1. This casing holds the screen 16 against the mouth of the faucet and the casing is provided with three sieves 18. A series of ports 20 are provided in the casing to admit air in a manner similar to that already described in connection with Fig. 1.

In this form, the screen 16 has only a central aperture, and at least one of the sieves 18 must have very narrow holes, as described in reference to Figure 1. If no constriction is provided at the outlet of the casing 14, the holes of the lower sieve must be as near as possible. The sieves 18 are here shown as distanced apart, but it is to be noted that they can be superposed, and that the number of these sieves is not restrictive.

In Fig. 4 the casing 3 is provided with a union coupling 5 for connection to an ordinary hose. The screen 7 is clamped between the casing 3 and the mouth of the faucet. Air is admitted to the interior of the casing by a series of horizontal perforations 9. In this case two screens are provided at the outlet as indicated at 11 and 13.

In Fig. 5 the plate 15 has a plurality of holes near the periphery and the casing 17 is formed with inwardly extending projections or baffles as indicated at 19. The principal part of the water coming through the openings in the plate 15 will strike these projections and be broken up.

Air is sucked through openings 21 and is forced, with the water through both sieves 19 mounted above a constricted part 22 at the outlet of the casing 17.

In Fig. 6 and 7, a perforated plate, 23, comprising a central opening or peripheral holes as in Fig. 5, or uniformly distributed holes as in Fig. 1, is mounted in a recess of a rubber connector 24, the cylindrical outside of which is provided with longitudinal recesses 25 for the admission of air. The casing proper 26 is engaged on this connector, and comprises one or more sieves 27 as indicated above, with or without a constriction such as 28 at the outlet. In the center of the connector 24, is rigidly mounted a tubular member 29, for the reception of a flexible or non-flexible hose or pipe 30 to be connected with any source of water under pressure.

paratus 35, communicating with the same ozonizer 36. If now one of the faucets is opened, the liquid discharged thereby draws in ozone from the said apparatus through the duct 37, and the apparatus is automatically thrown into action by the aforesaid switch. In order to avoid in this case the admission of air to the spouts from spouts which are not in operation, so that nothing but ozone is drawn in by the liquid, each spout is preferably provided with a back pressure valve.

In the example illustrated in the drawings, the transformer and the ozonizer are inclosed within the same casing.

Claims:

1. In a system for treating liquids with ozone, the combination with a duct for the liquid, means to add ozone to the liquid while passing through said duct, a plurality of cup shaped plates located within said duct so as to bar the free passage of the liquid and having apertures adapted to break the liquid up into fine streams.

2. In a system for treating liquids with ozone, the combination with a duct for the liquid, means to add ozone to the liquid while passing through said duct, a plurality of plates located within said duct so as to bar the free passage of the liquid and having apertures adapted to break the liquid up into fine streams, said plates being formed with upwardly extending flanges having teeth engaging in notches made in the surfaces of the adjacent plates.

3. In a system for treating liquids with ozone, the combination with the mixing chamber, of an electric ozonizer, means to throw said apparatus into operation, said means being located on the ozonizer and away from the mixing chamber, and a connection between said mixing chamber and ozonizer whereby said means for throwing the ozonizer into operation are controlled by the passage of the liquid through said mixing chamber.

4. In a system for treating liquids with ozone, the combination with a mixing chamber comprising a liquid supply, and means to draw in the ozone by suction, of an ozonizer, controlling means for the same, a suction duct connecting said ozonizer and said mixing chamber, means operated by the pressure within said suction duct to actuate said controlling means for the ozonizer.

5. In a system for treating liquids with ozone, the combination with a mixing chamber comprising a liquid supply, and means to draw in the ozone by suction, of an ozonizer, controlling means for the same, a suction duct connecting said ozonizer and said mixing chamber, means operated by the pressure within said suction duct to actuate said controlling means for the ozonizer, and a valve within said duct adapted to prevent the liquid from flowing from the mixing chamber to the ozonizer.

6. In a system for treating liquids with ozone, the combination with an ozonizer and a plurality of mixing apparatus for adding the ozone to the liquid, of connections between each of said mixing apparatus and the ozonizer, and automatic means controlled by each of said mixing apparatus to throw the ozonizer into operation.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MAX FUSS.

Witnesses:

JEAN GRUND,

CARL GRUND.

Note

Page 310 is on
Card 20

Note

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It is to be noted that in all the forms shown, the number of sieves, their form, and also the form of the perforated plate upstream of the casing's chamber, are not limited to those shown, and these may be removed for cleaning.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

A device for producing a jet of water containing air bubbles, comprising an injector portion which is provided, upstream of the part where it aspirates air, with a perforated cross partition and downstream the said part with an atomising and mixing part comprising one or more finely perforated plates, characterised in that the holes in said plate or plates are so small and close together as to divide the air into particles of such size as to form small air bubbles having a tendency to remain in suspension in the jet of liquid, the holes in said plate or plates, or the number of these plates or the outlet of the device being such as to force the liquid streamlets issuing from said holes to join together and to form at the outlet a single stream or jet.

Dated this 22nd day of June, 1938.

BROMHEAD & CO.,
Chartered Patent Agents,
229-230, Strand, London, W.C.2.

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625,084 COMPLETE SPECIFICATION 1 SHEET

Fig. 1

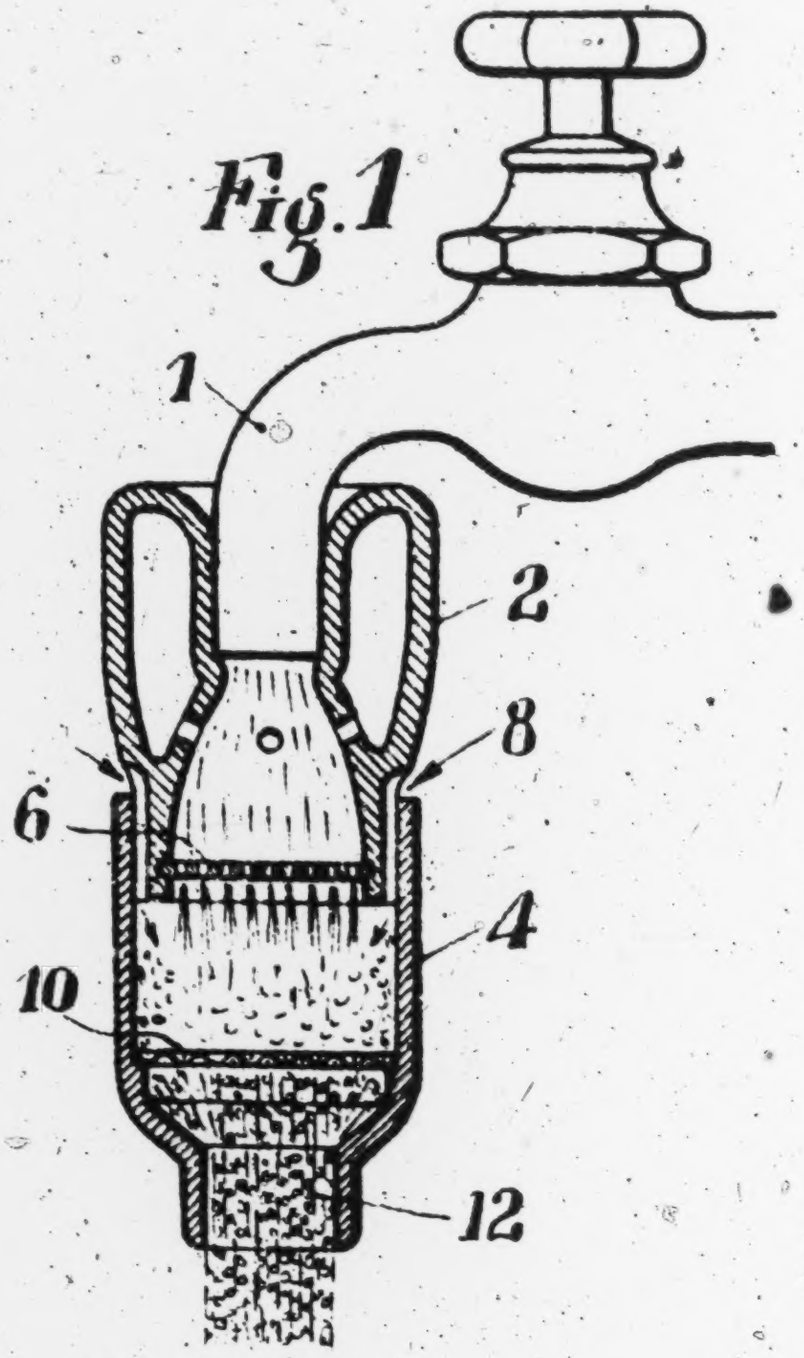
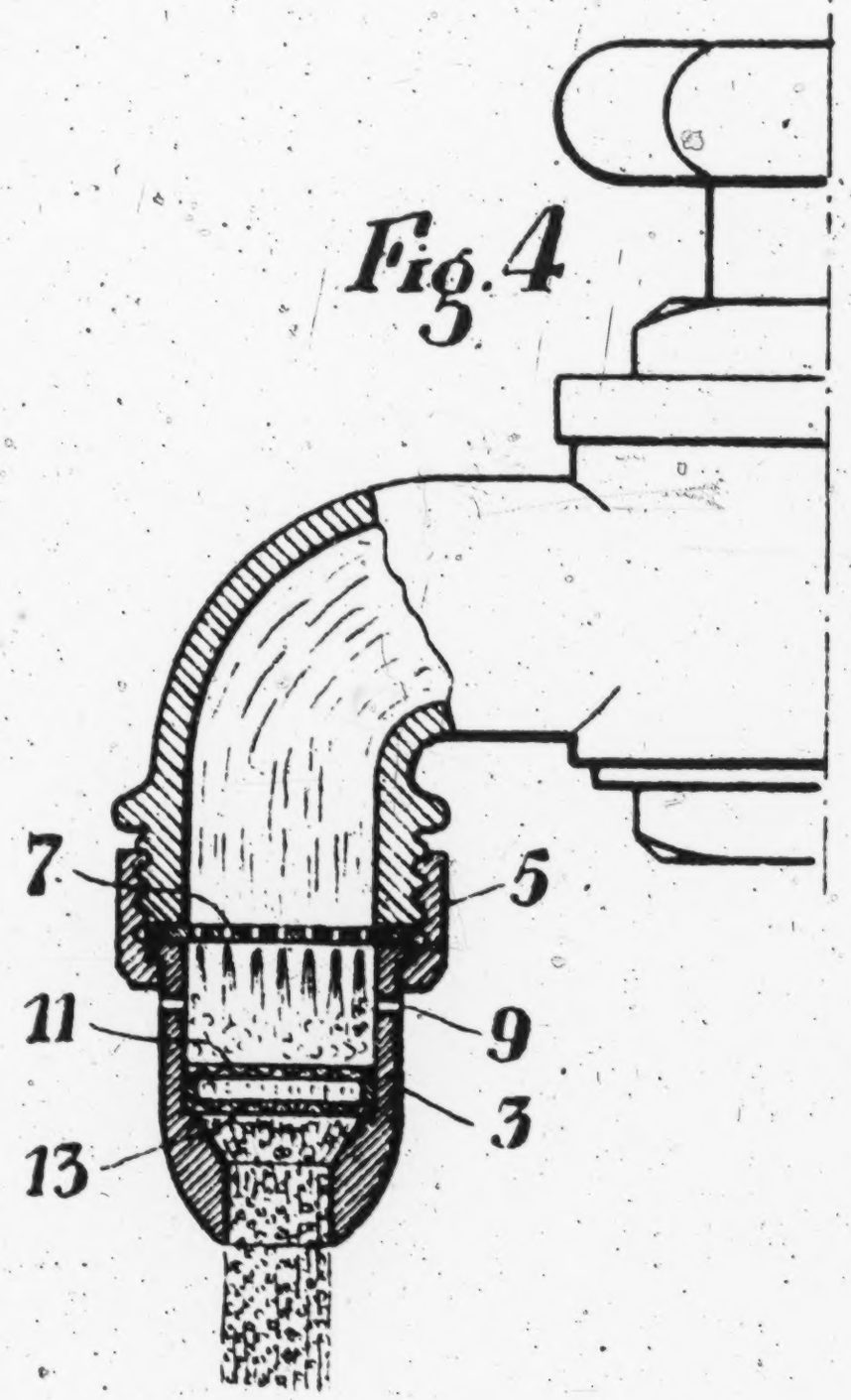


Fig. 4



Original on a reduced scale.]

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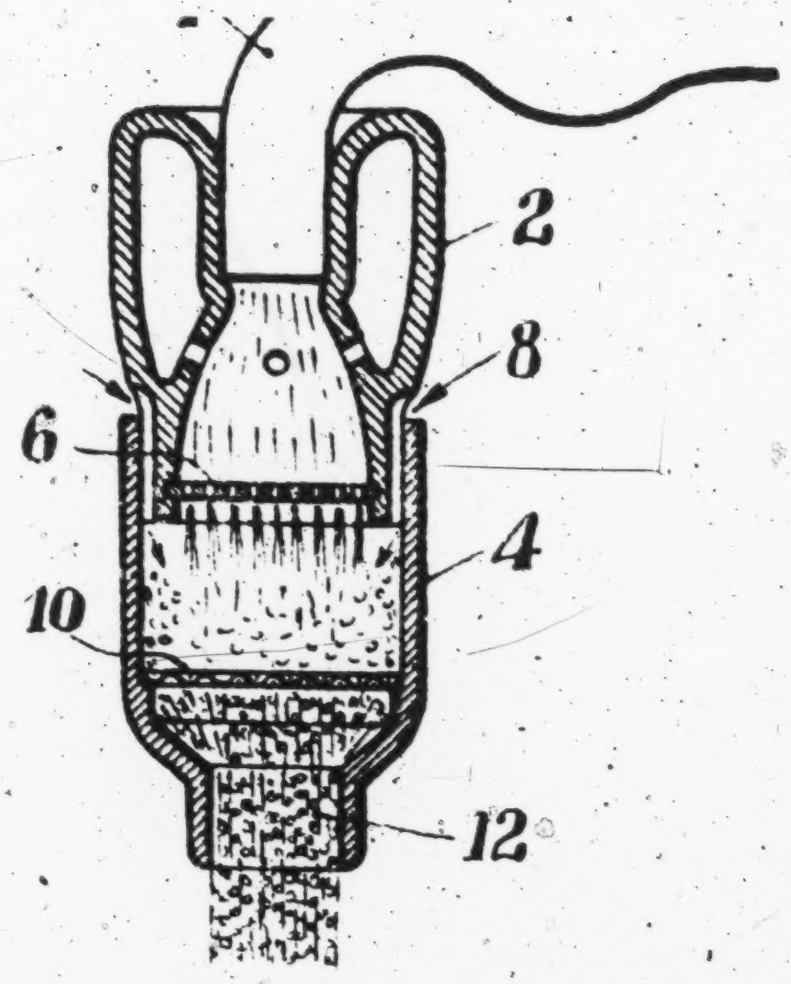


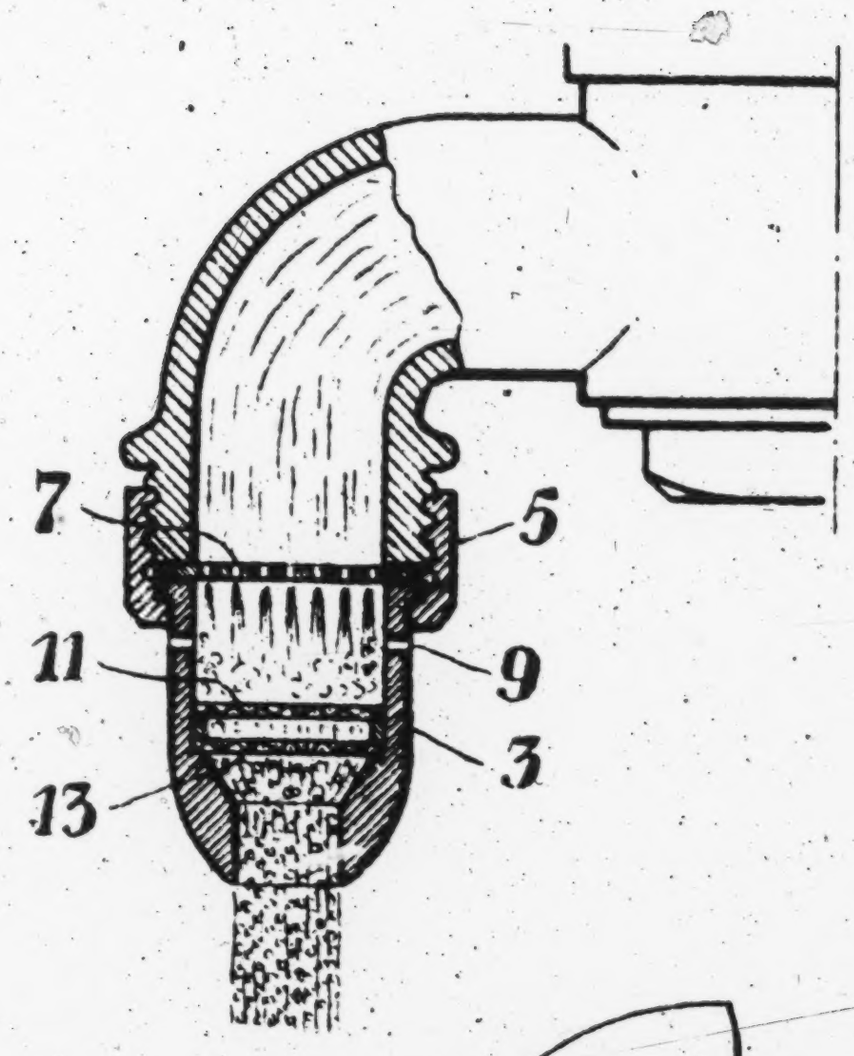


Fig.2

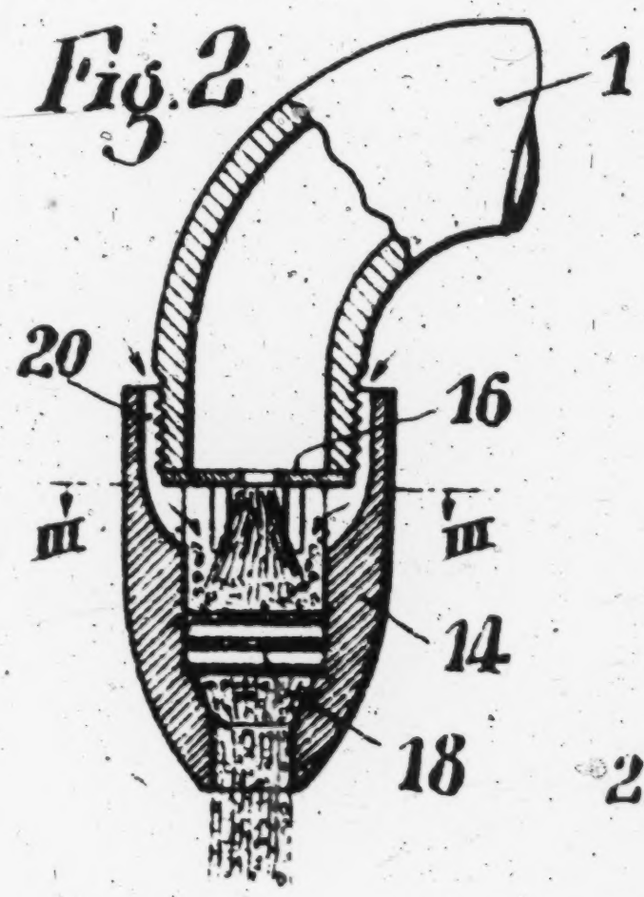


Fig.5

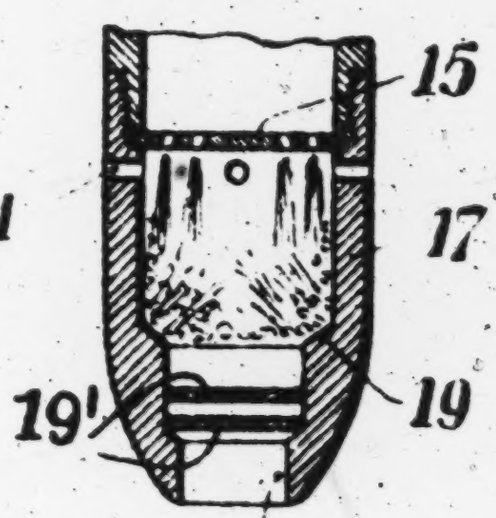


Fig.6

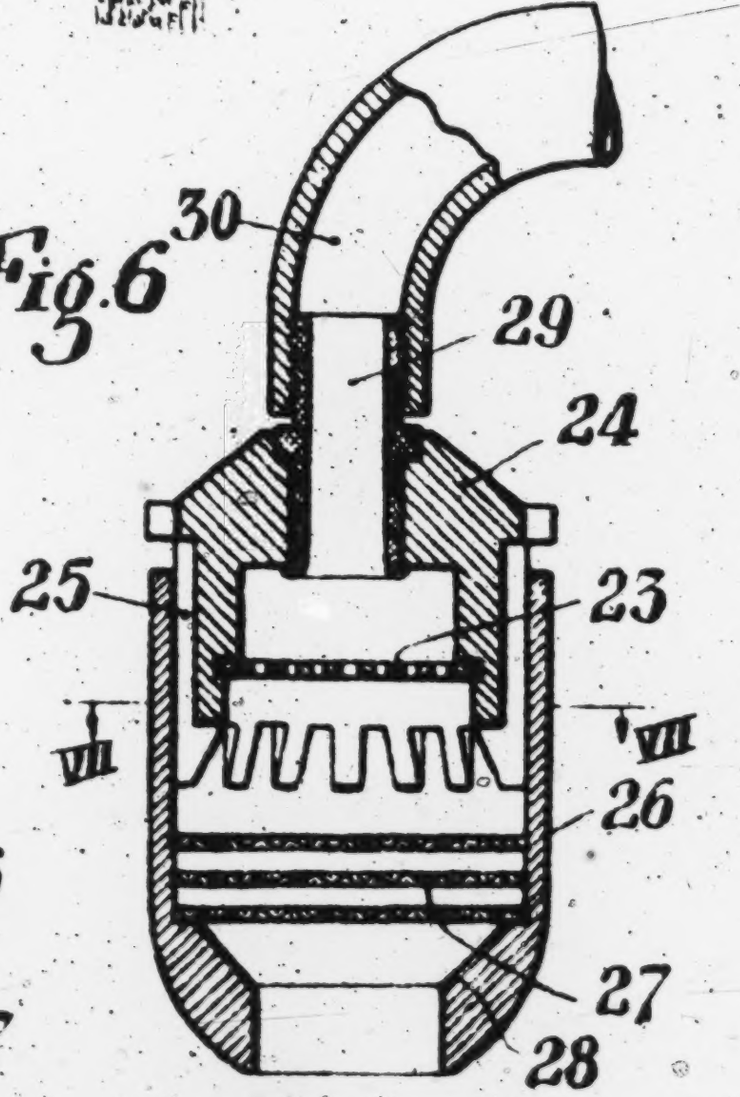


Fig.3

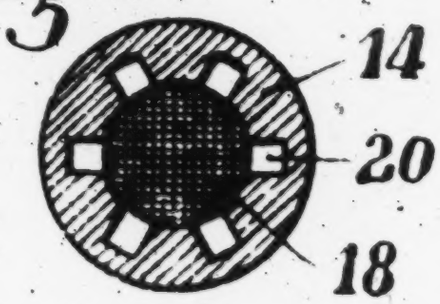
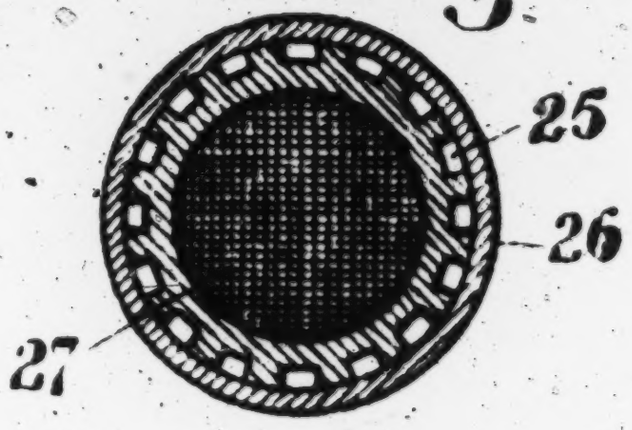


Fig.7



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Seal **Signature**

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Note

Pages 322-326 are on Card 23;
Pages 327-336 are on Card 24;
Pages 337-346 are on Card 25;
Pages 347-359 are on Card 26;
Pages 360-372 are on Card 27;
Pages 373-377 are on Card 28;
Pages 378 is in the next frame;
Pages 379-380 are on Card 28.

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490,112

Canadian Patent

CANADA
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PATENT No. 490,112 ISSUED FEB. 3, 1953

Fluid Mixing Device

Elie Aghnides, Brussels, Belgium

Application November 15, 1939, Serial No. 468,776
5 Claims

1

This invention relates to apparatus for the intimate mixture of the ambient air with water flowing under pressure, and consisting of an upper part forming ejector for the intake of the air by the water under pressure, and an outlet, and comprising between this outlet and the ejector a dividing mixer through which the two fluids water and air are forced to pass. According to the purpose of this invention, such apparatus are essentially meant to be fitted at the outlet of a tap for the distribution of the town's water supply.

In certain known contrivances of this type, the dividing mixer is made up of projections, baffles, stops, or other radial devices, or otherwise disposed, on which the jets of both fluids come to be broken up so as to determine a more or less intimate intermixture of both fluids. In these devices, the jet leaving the apparatus has no cohesion, it is exactly like an ordinary water jet in appearance, the air which is carried escaping immediately at the outlet.

In other known apparatus, the dividing mixer consists of a plate with relatively large perforations, which give the same result as that obtained by means of projections or of baffles.

Further, a device of this type is known in which the divider is formed by at least one plate with extremely fine holes, of a capillary character, these holes which are very tiny, determine according to the characteristic features of this apparatus, a real atomisation or pulverization of the air, which is thus divided in such tiny particles that they momentarily escape to the law of gravitation, and they furnish a water jet of grey appearance, which is flat, not frothy, containing a very weak proportion of air which remains in suspension in this water during a more or less long period of time.

In a general manner, the known devices meant to "aerate" the water, fail in their object, because they supply a jet in which the air, carried along in the shape of big bubbles, escapes immediately at the outlet of the apparatus, or else the air is so finely divided up in them in such very minute particles that the percentage of air carried along is extremely small and gives to the jet an appearance which is disagreeable and not appetising.

I have found that it is possible, by simple and cheap means which are not cumbersome, to obtain a jet with a big proportion of air (up to 30-60% of the total volume), in which the air remains in suspension in the shape of fine bubbles which impart a total volume), in which the air remains in suspensnow-white colour to it, this jet, which is soft to the touch, being essentially frothy, very light, non-splashing, quite cylindrical and regular. Such a jet

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with a soap solution gives an abundant froth, which is compact and resistant, never obtained up till to-day; poured into a glass, this jet fills the glass, then in a few minutes, through the escape of the air which it contained, only occupies 40-70% of the initial volume, which proves the enormous quantity of air carried in the jet.

As stated, the apparatus, according to the invention consists of an upper part forming injector, and below this, a dividing mixer. The latter consists of one or more perforated devices or of screens superposed or else disposed step-wise, and according to the invention, this dividing mixer must, to give the new result, that is to say a jet which is stable, frothy and of snow-white colour—result which until now had never been sought for—answer at one and the same time to the three following fundamental conditions:

a—the passages across the dividing mixer, at the place where the section is smallest, must correspond to a circular section of a diameter included between 0·05 and 2·5 mm.

b—the total height of the said passage, without taking into account the eventual intervals between the elements disposed step-wise, must not exceed 30 times the value of the diameter of the circular section to which the section of the passages corresponds.

c—the passages must be so close together that the suction zone of each jet coming out of any passage whatever cuts the suction zone of the neighbouring jets, or must at least be at a tangent with it.

As a non-limitative example, a contrivance giving good result has been obtained by using 3 No. 40 screens (40 wires of 0·23 mm. section per inch) with an interspace of 1 mm. between each other, placed at 5-10. mm. beneath a perforated plate having 32 holes of 8/10 of a mm. in diameter and on an exit vent or outlet restricted to a 17 mm. diameter.

The first of the conditions aims at obtaining a division of the air such that sufficiently small bubbles are obtained in the jet, that is to say having the tendency of remaining in a suspended state in the jet; below these dimensions one falls into apparatus for atomising the air, and above, one obtains bubbles which are too big, which burst immediately and escape from the jet at the outlet of the apparatus. These passage dimensions, can evidently be obtained by means of the superposition of screens with larger holes, where the holes do not exactly coincide over the entire height of the passages.

The second condition aims at obtaining a full

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Pages 327-336 are on Card 24;
Pages 337-346 are on Card 25;
Pages 347-359 are on Card 26;
Pages 360-372 are on Card 27;
Pages 373-377 are on Card 28;
Page 378 is in the next frame;
Pages 379-380 are on Card 28

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190.112

jet, with a large proportion of air The greater the height of the dividing device the greater is the resistance which it offers to the passage of the two fluids. beyond a certain resistance, the quantity of air carried away decreases, and the apparatus loses some of its interest

The third condition aims at obtaining a coherent well and plain jet, in which the air bubbles are imprisoned in the jet it equally aims at decreasing the resistance offered by the mixing means

These three essential conditions can give birth to quite a series of interesting embodiments, either applied to themselves or in combination with other constructive characteristics as will be brought out in the following description made with reference to the annexed drawings, in which

Fig 1 is an axial section of a first embodiment

Fig 2 is the same section of a variant

Fig 3 is a section according to III-III of Fig 2.

Fig 4 is a section of another variant

Fig 5 is a section of still another variant

Fig 6 is a section of a variant to be connected with a flexible connector

Fig 7 is a section according to VII-VII of Fig 6

Referring to Fig 1, 1 designates an ordinary household tap, and 2 is a connection for the tap, this connection is of known construction, 4 is the body of the mixing-divider. The perforated plate 6 allows the water to pass into the chamber 4 in the form of a large number of little jets, a series of passages 8 are provided for the admission of the external air into the chamber 4, through the action of the jets coming out of 6 10 designates a screen or sieve at the lower part of the body 4, above a narrowed outlet 12 The screen 10 consists of a sieve with passages, the section of which corresponds with tha tof a circle the diameter of which is included between 0 05 mm. and 2 5 mm and which answers to the three essential conditions previously indicated The contraction 12 at the outlet also offers a great interest from the point of view of the regularity of the jet which is escaping, and of the beauty of this jet

In the example shown in Fig 2, a metallic envelope 14 is screwed directly onto the tap 1 This envelope sustains the perforated plate 16 against the outlet of the tap, and it contains a divider consisting of three sieves 18 disposed step-wise or directly superposed A series of passages 20 is provided for the admission of the air

In this example the plate 16 is only provided with a single central hole The envelope 14 also has a contracted outlet

In Fig 4, the envelope 3 is equipped with a connector 5 meant to connect it with an ordinary tap The perforated plate 7 is fastened between the envelope 3 and the outlet of the tap, the air is admitted through perforations 9 The divider consists of two sieves 11 and 13

In Figure 5, the perforated plate 15 carries a series of holes towards the periphery, and the envelope 17 is provided with internal projections 19 The main part of the water passing through 15 strikes these projections and is broken up, and is already mixed with the air sucked in by the openings 21 Here, the divider consists of two sieves lodged in a contracted part 22 of the envelope 17

In Figs 6 and 7 a perforated plate 23 provided with a single central hole or with peripheric holes, or with holes uniformly distributed, is fitted in a notch in a rubber connector 24, of which the external cylindrical face is provided with longitudinal grooves 25 for the admission of the air. The envelope 26 is clamped on this connector and has three spaced sieves 27, and a contracted outlet 28. In the centre of the connector 24 a rigid tube 29 is rigidly fitted, so as to receive a flexible tube 30 which is to be connected with a source of water under pressure

Having now fully described my invention, what I claim and desire to secure by letters patent is

1 A device for producing a coherent jet of water containing air bubbles, comprising a chamber the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water, after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet

2 A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and means for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet

3 A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet, the resistance offered by the said means and

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the cross sectional area of the orifice being proportioned to effect the entrainment and mixing of the air with water before their discharge from the said outlet end.

4. The device of claim 1 in which the said means comprises a screen at the discharge end of the chamber, the openings in which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet

5. The device of claim 1 in which the said means comprises superposed screens, the screen at the discharge end of the chamber having apertures which are sufficiently close together so that the

6

streams of aerated water issuing therefrom immediately join each other to form a single jet

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Box 368, Station "H",
Montreal, Que.,
Patent Agent.
of the Applicant.

EDMOND CLOUTIER, C.M.G., O.A., D.S.P., Queen's Printer and Controller of Stationery, Ottawa, 1953

Note

Pages 384 and 386 are blank;

Pages 385,387,388, and 389 are on Card 28.

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ENGLISH TRANSLATION OF AGHNIDES' DUTCH PATENT NO. 65,293

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Patent Office of
the Netherlands

PATENT No. 65,293
Class 12 c 4 c (101 cs 4).

ELIE AGHNIDES, of Brussels.

SPOUT-ATTACHMENT

Application No. 93,976, filed June 22nd, 1939, at 14:45 o'clock, laid out or made public on October 15, 1949,—priority of June 22, 1938 for claim 1 (Great Britain).

The invention relates to a spout-attachment in one part which forms an injector and diaphragm, after which diaphragm air inlet openings are provided and with a single or plural dividing mixing body between this outlet opening and the air inlet openings.

A spout-attachment of this type is known from the French patent No. 800,069, in which according to this publication, air is distributed very finely in the water jet so that an emulsion results and the jet does not froth or foam.

In accordance with the invention, in this distributing and mixing body passage channels are present for the mixture of water and air which have a diameter of about 0.05 to 2.5 mm. and a total maximum length of about 30 times this diameter, as well as a mutual spacing which in-

sures an immediate combination of the separate jets issuing from the distributing and mixing body, and insures the inclusion of the air taken along, and has for a given dis-
(157):
tributing and mixing body a relation between the distance from the diaphragm to the distributing and mixing body and the required diameter of the distributing and mixing body: a value which is less than 1.4.

In this embodiment of the spout-attachment, the issuing jet does include a great quantity of air, in the form of bubbles, which prevents that the jet of foam becomes snow-white as soon as the jet is collected in a vessel. The jet may comprise 30 to 40 per cent by volume of air.

The distributing member meeting the above requirements may be attached in very varying ways, which are made clear in the following on the basis of the drawings. In the drawings:

Figs. 1 and 2 show axial sections of two different embodiments of the spout attachment.

Fig. 3 is a cross-section according to the line III—III of Fig. 2.

Fig. 4 an axial section of a third form of embodiment.

Fig. 5 an axial section of a distributing body according to an indicated embodiment.

Fig. 6 a longitudinal section of a spout-attachment, which is adapted to be attached to a flexible hose.
(158):

Fig. 7 a cross-section according to line VII—VII of Fig. 6, and

Figs. 8 and 9 axial sections of two other embodiments.

In Fig. 1 an ordinary house-tap 1 is shown, which is provided with a connecting-piece 2, to which the spout-attachment 4 is fastened. The water flows through the perforated plate 6 in the spout-attachment 4 in the form of a great number of small jets. On the circumference of this con-

necting-piece 2 are provided a row of channels 8, through which air from the outside may enter the spout-attachment under the effect of the water-jets coming from the apertures 6. In the lower part of the spout-attachment 4 is provided above a restricted outlet aperture 12 a sieve-plate 10. The meshes of this sieve-plate 10 are disposed within the confines of a circle, of which the diameter lies between 0.05 and 2.5 mm. The restriction 12 of the outlet opening compels the outflow in a regular stream.

In the embodiment according to Figs. 2 and 3, there is secured on the tap 1 a metal sleeve 14 which holds tight the perforated diaphragm 16 against the outlet-opening of the tap and which includes a distributing body which (159):

consists of three sieve-plates 18 at some distance or immediately above one another. The diaphragm 16 has in this embodiment only one central opening and the sleeve 14 has here likewise a restricted outflow.

In the embodiment according to Fig. 4, the sleeve is provided with a connecting-piece 5, with the aid of which it may be fastened to an ordinary water tap. The perforated diaphragm 7 is held tight between the sleeve 3 and the lower end of the tap, and the air enters through a row of apertures 9. The distributing body consists here of two sieve-plates 11, 13 disposed above one another.

The embodiment according to Fig. 5 has a perforated diaphragm 16, of which the openings are disposed on the circumference. The sleeve 17 is in this embodiment provided with inward projections 19. The main part of the water streams issuing from the openings in the diaphragm strike against the projection 19 so as to break off and are already mixed with the air drawn through the apertures 21, before the water reaches the distributing body. The distributing body is here formed by two sieve-plated disposed in the restricted part 22 of the sleeve 17.

In the embodiment according to Figs. 6 and 7, the diaphragm 23, which may have one single central opening or (160):
openings uniformly distributed therearound, is positioned in a groove of a rubber connecting-piece 24, in which the cylindrical outer plane is provided with longitudinal grooves 25 for the admission of air. The sleeve 26 is pressed on this connecting-piece 24 and comprises three sieve-plates 27 disposed at a distance and has a restricted outlet-opening 28. In the center of the connecting-piece 24 a tube-part 29 is immovably fixed, whereupon a flexible hose 30 may be attached which is connected with a source of water under pressure.

In the embodiment according to Fig. 8, the spout-attachment 31 is provided on the rim 32 with lateral apertures for the admission of air. The spout-attachment is screwed to a metal connecting-piece 33, which in its turn is screwed on the end of a jet 34. The perforated diaphragm 35 is held tight between the connecting-piece 33 and the spout-attachment 32. The distributing body consists of three sieve-plates 39, which are separated from one another by rings 40. In this embodiment, the channel of the connecting-piece 33 has a restriction above the diaphragm 35, which has as its object the concentrating of the stream of water in the axis of the channel with a view after passing it from the diaphragm 35 to attaining a greater velocity in the mid- (161):
dle, so that the distribution of the air drawn along over the entire cross-section of the jet before reaching of the distributing body 39 is made more uniform.

The embodiment according to Fig. 9 has likewise a restriction 37 and below this restriction an extra perforated plate 36, which is disposed above the diaphragm 35. The plate 36 has in view, with respect to the effect of the restriction 37 to distribute the water better over the spout-attach-

ment 31. The extra plate 36 may also be applied to the embodiments according to Figs. 1 and 4, for instance, without the presence of the restriction 37. In the embodiment according to Fig. 9, the distributing body consists of three sieve-plates 41 disposed above one another, which are contained in a ring 42.

CLAIMS:

1. Spout-attachment in one part which forms an injector and through which water may flow through a perforated diaphragm, after which diaphragm air inlet openings are provided and with an outlet opening and a single or plural-divided mixing body between this outlet opening and the air inlet openings, characterized in this, that in the distributing and mixing body (10, 11 and 13, 18, 27, 39, 41) passage (162):
channels are present for the mixture of water and air, which have a diameter of about 0.05 to 2.5 mm. and a total maximum length of about 30 times this diameter, as well as a mutual spacing, which insures an immediate combination of the separate streams coming from the distributing and mixing body and insures the inclusion of the air taken along, and that for a given distributing and mixing body the relation between the distance from the diaphragm (6, 7, 15, 16, 23, 35, 36) to the distributing and mixing body and the required diameter of the distributing and mixing body has a value which is less than 1.4.

2. Spout-attachment according to claim 1, characterized in this, that upstream from the diaphragm (23 or 35) a perforated body (36) and/or a restricted passage opening (29 or 37) is provided.

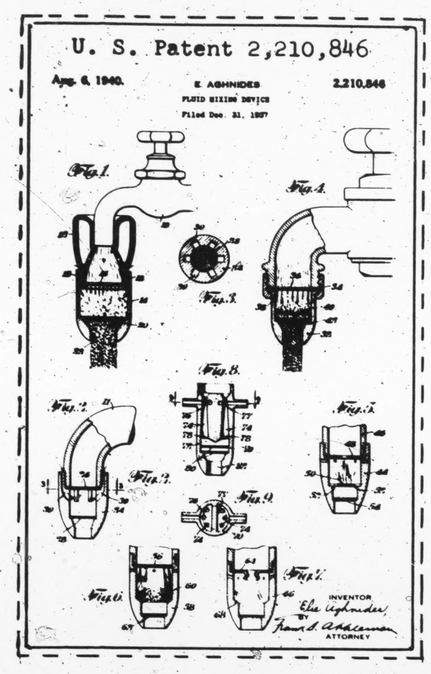
In the United States
Aghnides has sworn that these patents
within the red enclosure are the same invention.

In Canada
Aghnides has sworn that these patents
within the green enclosure are the same invention.

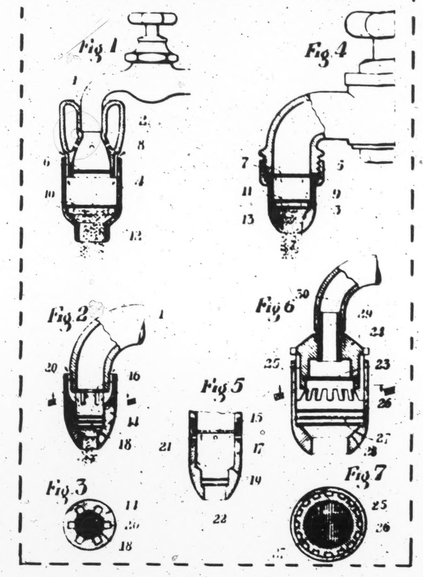
(RED)

(GREEN)

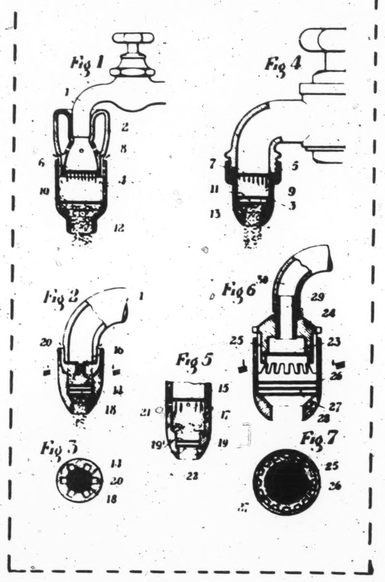
U. S. Patent 2,210,846



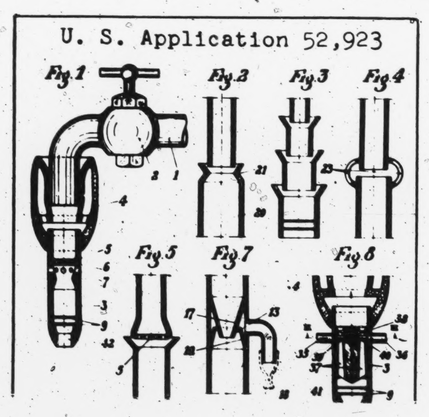
Figures 1-7 of
Dutch Patent 65,293



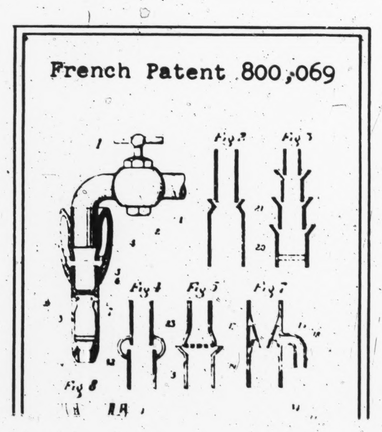
British Patent 625,084



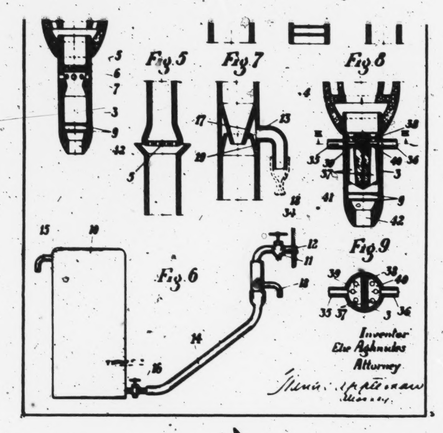
U. S. Application 52,923

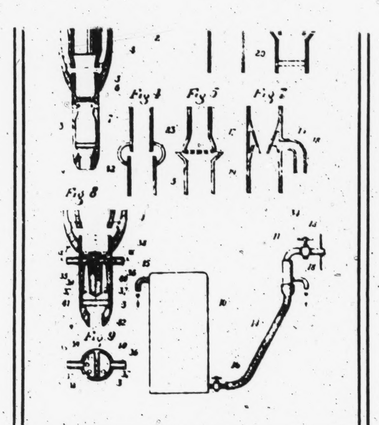


French Patent 800,069



"CHART No. 2"





The drawings of

U. S. Application 52,923	and	French 800,069

are identical.

1. In Canada
Aghnides has sworn that

U. S. 2,210,846

is the same invention as both

Dutch 65,293	and	British 625,084

2. In the Netherlands
Aghnides has sworn that

Dutch 65,293

is a different invention from

French 800,069

2 App. 322 Canadian File Wrapper

Application No. 408,776 Filed NOV. 15 1952

Class 209

Sub-Class 1

Title Fluid Pumping Device

Index Title

Inventor E. ARMIES

Referred to Division 7 193

Examiner Reports and Amendments

A

OCT 27 1950 B

MAY 30 1952 C

Stop Order { Entered / Removed

Publish { Claims 1 2 3 4 / Figure Figs. 1 & 4

Notice of Allowance

Dated DEC 2 1952

Allowed NOV 27 1952 193

Examiner.

(OVER)

MA ON & MARION
NEYS AND EXPERTS
12 NIVERSITY STREET
ONTREAL, CANADA

Form ... COPYRIGHT OFFICE
NOV 16 1939
PATENT ACCOUNTANT

Application for Canadian Patent

PETITION WITH POWER OF ATTORNEY
AND
APPOINTMENT OF CANADIAN REPRESENTATIVE

Patent Act 1935

TO THE COMMISSIONER OF PATENTS,
OTTAWA,

THE PETITION OF Elie AGHNIDES, a citizen of the Greek Republic and resident of Brussels, Belgium, 14, Boulevard de Waterloo,

showeth:—

THAT your petitioner made the invention entitled Device for intimately mixing ~~air with water flowing under pressure~~ Fluid mixing Device

which is described and defined in the attached specification.

THAT your petitioner verily believes that the said invention was not known or used by others before it was invented by him (him or them) and will neither have been in public use or on sale in Canada, nor have been described in any patent or in any publication printed in Canada or in any other country more than two years prior to the presentation or filing of this petition. {Your petitioner requests that this application be treated as entitled to priority as follows having regard to the following applications for patents heretofore made in other countries, namely: Holland, June 22nd 1939 - Sweden, June 26th 1939.} (Ld. 28/10/52)

Specify the applications relied upon and indicate to which of the claims now made they respectively relate.

THAT your petitioner hereby appoints Raymond A. Robic of 1255 University Street, Montreal, Canada, to represent him (him or them) and stand in his (his or their) place and stead for all purposes of the Patent Act 1935, including the service of any proceedings taken under any provision of the said Act.

THAT your petitioner appoints Messrs. Marion & Marion, of 1255 University Street, P.O. Box 390 (Station "B"), Montreal, Canada, his (his or their) Attorneys, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to sign the specification and drawings, to receive the Patent and to transact all business in the Patent Office connected therewith.

THAT the allegations made in this petition are verified on oath as required by The Patent Act, 1935.

YOUR petitioner therefore pray that a patent may be granted to him (him or them) for the said invention

SIGNED AT Brussels, THIS 19th

DAY OF September, 1939.

Elie Aghnides

(Signature of inventor or inventors)

2 App. 324 Canadian File Wrapper

Oath

THE PATENT ACT, 1935

(FOR EXECUTION BEFORE FILING APPLICATION)

I, Elie AGHNIDES, citizen of Greece, formerly

of 14 Blvd. de Waterloo, Brussels, Belgium, and presently of 527 Lexington Avenue, New York City, N.Y. United States of America, and whose occupation is

make oath and say:

1. That I am (a) the inventor of an invention entitled

~~" DEVICE FOR INTIMATELY MIXING AIR WITH WATER FLOWING UNDER PRESSURE"~~ Fluid Mixing

for which I solicit a patent by petition ~~dated~~ filed the 15th day of November 1939

2. That I verily believe that the said invention was not known or used by others before it was invented as aforesaid and will have neither been in public use or on sale in Canada, nor described in any patent or in any publication printed in Canada or in any other country, more than two years before the filing of the said application.

3. That no patent for the said invention has issued or will issue to me or any legal representatives prior to the filing of my said application (*b*) except as a result of the application specified in the request for priority in my said application.

4. (c) That no application for a patent for the invention as defined in the claims specified in the request for priority in my said application has been made by me or any one claiming under me before the date of the earliest application specified in such request.

5. That the several allegations contained in the said application are respectively true and correct.

SWORN BEFORE ME AT
New York. N. Y.

this 7

day of May. 1947

Elie Aghnides
(Inventor's Signature)

Gertrude M. Reiner

GERTRUDE M. REINER
Notary Public in the State of New York
Residing in Queens County
Queens Co. Clk's No. 1977
Certificates Filed in
N. Y. Co. Clk's No. 647, Reg. No. 217-R-9
Commission Expires March 30, 1949

(a) *If more than one inventor insert the words "one of" and add (s) to word "Inventor" [illegible] oath for each Inventor is required.*

(b) *Delete to end of paragraph if no claim for priority is made or if no patent issued prior to [illegible] application.*

(c) *Delete paragraph if no claim for priority is made.*

(d) *Signature of inventor.*

(e) *Signature of person administering oath. Official Seal must be affixed.*

(f) *Official capacity of person administering oath. Notary Public, Judge or other officer for taking affidavits*

Important: The oath must be sworn not earlier than thirty days before the date of the filing of the petition. If the Jurat is in any other language than English or French a certified translation must be supplied. Legalization is not necessary

Canadian File Wrapper 2 App. 325

S P E C I F I C A T I O N

TO ALL WHOM IT MAY CONCERN :

Be it known that ELIE AGHMIDES, a citizen of Greece and resident of Brussels, Belgium having made an invention entitled:

"FLUID MIXING DEVICE"

the following is a full, clear and exact disclosure of the nature of the said invention and of the best mode of realizing the advantages thereof.

490112

This invention relates to apparatus for the intimate mixture of the ambient air with water flowing under pressure, and consisting of an upper part forming injector for the intake of the air by the water under pressure, and an outlet, and comprising between this outlet and the injector a dividing mixer through which the two fluids water and air are forced to pass, According to the purpose of the invention, such apparatus are essentially meant to be fitted at the outlet of a tap for the distribution of the town's water supply.

In certain known contrivances of this type, the dividing mixer is made up of projections, bafiles, steps, or other radial devices, or otherwise disposed, on which the jets of both fluids come to be broken up so as to determine a more or less intimate intermixture of both fluids. In these devices, the jet leaving the apparatus has no cohesion, it is exactly like an ordinary water jet in appearance, the air which is mixed escaping immediately at the outlet.

C

In other known apparatus, the dividing mixer consists of a plate with relatively large perforations, which gives the same result as that obtained by means of projections or of baffles.

Further, a device of this type is known in which the divider is formed by at least one plate with extremely fine holes, of a capillary character; these holes which are very tiny, determine according to the characteristic features of this apparatus, a real

atomisation or pulverisation of the air, which is thus divided in such tiny particles that they momentarily escape to the law of gravitation, and they furnish a water jet of grey appearance, which is flat, not frothy, containing a very weak proportion of air which remains in suspension in this water during a more or less long period of time.

In a general manner, the known devices meant to "aerate" the water, fail in their object, because they supply a jet in which the air, carried along in the shape of big bubbles, escapes immediately at the outlet of the apparatus, or else the air is so finely divided up in them in such very minute particles that the percentage of air carried along is extremely small and gives to the jet an appearance which is disagreeable and not appetising.

I have found that it is possible, by simple and cheap means which are not cumbersome, to obtain a jet with a big propertion of air (up to 30-60 % of the total volume), in which the air remains in suspension in the shape of fine bubbles which impart a snow-white colour to it, this jet, which is soft to the touch, being essentially frothy, very light, non-splashing, quite cylindrical and regular. Such a jet with a soap solution gives an abundant froth, which is compact and resistant, never obtained up till to-day ; poured into a glass, this jet fills the glass, then in a few minutes, through the escape of the air which it contained, only occupies 40-70 % of the initial volume, which proves the enormous quantity of air carried in the jet.

As stated, the apparatus, according to the invention consists of an upper part forming injector, and below this, a dividing mixer. The latter consists of one or more perforated devices or of screens superposed or else disposed step-wise, and according to the invention, this dividing mixer must, to give the new result, that is to say a jet which is stable, frothy and of a snow-white colour - result which until now had never been sought for - answer at one and the same time to the three

following fundamental conditions :

a - the passages across the dividing mixer, at the place where the section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm.

b - the total height of the said passages, without taking into account the eventual intervals between the elements disposed step-wise, must not exceed 30 times the value of the diameter of the circular section to which the section of the passages corresponds.

c - the passages must be so close together that the suction zone of each jet coming out of any passage whatever cuts the suction zone of the neighbouring jets, or must at least be at a tangent with it.

As non-limitative example, a contrivance giving good results has been obtained by using 3 N° 40 screens (40 wires of 0,23 mm. section per inch, with an interspace of 1 mm. between each other, placed at 5-10 mm. beneath a perforated plate having 32 holes of 8/10 of a mm. in diameter and on an exit vent or outlet restricted to a 17 mm. diameter.

The first of the conditions aims at obtaining a division of the air such that sufficiently small bubbles are obtained in the jet, that is to say having the tendency of remaining in a suspended state in the jet ; below these dimensions one falls into apparatus for atomising the air, and above, one obtains bubbles which are too big, which burst immediatly and escape from the jet at the outlet of the apparatus. These passage dimensions, can evidently be obtained by means of the superposition of screens with larger holes, where the holes do not exactly coincide over the entire height of the passages.

The second condition aims at obtaining a full jet, with a large proportion of air. The greater the height of the dividing device, the greater is the resistance which it offers to the passage of the two fluids ; beyond a certain resistance, the

quantity of air carried away decreases, and the apparatus loses some of its interest.

The third condition aims at obtaining a coherent well and plain jet, in which the air bubbles are imprisonned in the jet; it equally aims at decreasing the resistance offered by the mixing means.

These three essential conditions can give birth to quite a series of interesting embodiments, either applied by themselves, or in combination with other constructive characteristics, as will be brought out in the following description made with reference to the annexed drawings, in which:

Fig. 1 is an axial section of a first embodiment.

Fig. 2 is the same section of a variant.

Fig. 3 is a section according to III-III of Fig. 2.

Fig. 4 is a section of another variant.

Fig. 5 is a section of still another variant.

Fig. 6 is a section of a variant to be connected with a flexible connector.

Fig. 7 is a section according to VII-VII of Fig. 6.

Referring to Fig. 1, 1 designates an ordinary household tap, and 2 is a connection for the tap; this connection is of known construction, 4 is the body of the mixing-divider. The perforated plate 6 allows the water to pass into the chamber 4 in the form of a large number of little jets, a series of passages 8 are provided for the admission of the external air into the chamber 4, through the action of the jets coming out of 6. 10 designates a screen or sieve at the lower part of the body 4, above a narrowed outlet 12. The screen 10 consists of a sieve with passages, the section of which corresponds with that of a circle the diameter of which is included between 0,05 mm. and 2,5 mm., and which answers to the three essential conditions previously indicated. The contraction 12 at the outlet also offers

a great interest from the point of view of the regularity of the jet which is escaping, and of the beauty of this jet.

In the example shown in Fig.2, a metallic envelope 14 is screwed directly onto the tap 1. This envelope sustains the perforated plate 16 against the outlet of the tap, and it contains a divider consisting of three sieves 18 disposed step-wise or directly superposed. A series of passages 20 is provided for the admission of the air.

In this example, the plate 16 is only provided with a single central hole. The envelope 14 also has a contracted outlet.

In Fig.4, the envelope 3 is equipped with a connector 6 meant to connect it with an ordinary tap. The perforated plate 7 is fastened between the envelope 3 and the outlet of the tap ; the air is admitted through perforations 9. The divider consists of two sieves 11 and 13.

In Fig.5, the perforated plate 15 carries a series of holes towards the peripnery, and the envelope 17 is provided with internal projections 19. The main part of the water passing through 15 strikes these projections and is broken up, and is already mixed with the air sucked in by the openings 21. Here, the divider consists of two sieves lodged in a contracted part 22 of the envelope 17.

In Figs.6 and 7, a perforated plate 23, provided with a single central hole, or with peripheric holes, or with holes uniformly distributed, is fitted in a notch in a rubber connector 24, of which the external cylindrical face is provided with longitudinal grooves 25 for the admission of the air. The envelope 26 is clamped on this connector and has three spaced sieves 27, and a contracted outlet 28. In the centre of the connector 24 a rigid tube 29 is rigidly fitted, so as to receive a flexible tube 30 which is to be connected with a source of water under pressure.

Having now fully described my invention, what I claim and desire is to secure by letters patent is:

1. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

A

2. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and means for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

7

3. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet, the resistance offered by the said means and the cross sectional area of the orifice being proportioned to effect the entrainment and mixing of the air with water before their discharge from the said outlet end.

4. The device of claim 1 in which the said means comprises a screen at the discharge end of the chamber, the openings in which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

5. The device of claim 1 in which the said means comprises superposed screens, the screen at the discharge end of the chamber having apertures which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a single jet.

SIGNED AT Brussels, this 19th day of September 1939.

Elie Aghnides (d)
(Inventor's Signature)

Oath

THE PATENT ACT, 1935

(FOR EXECUTION BEFORE FILING APPLICATION)

I, Elie AGHNIDES, a citizen of the Greek Republic and resident of Brussels, Belgium, 14, Boulevard de Waterloo,

and whose occupation is Engineer

make oath and say:

1. That I am (a) the inventor of an invention entitled Device for intimately mixing air with water flowing under pressure

for which I solicit a patent by petition dated the 19th day of September 1939.

2. That I verily believe that the said invention was not known or used by others before it was invented as aforesaid and will have neither been in public use or on sale in Canada, nor described in any patent or in any publication printed in Canada or in any other country, more than two years before the filing of the said application.

3. That no patent for the said invention has issued or will issue to me or my legal representatives prior to the filing of my said application (b) except as a result of the application specified in the request for priority in my said application.

4. (c) That no application for a patent for the invention as defined in the claims specified in the request for priority in my said application has been made by me or any one claiming under me before the date of the earliest application specified in such request.

5. That the several allegations contained in the said application are respectively true and correct.

SWORN BEFORE ME AT

Brussels, Kingdom of Belgium,

this 19th

day of Spptember, 1939.

Elie Aghnides (d)

COMMERCIAL ATTACHÉ · CANADIAN LEGATION · BRUSSELS

Yves Lamontagne (e)

COMMISSIONER OF OATHS FOR CANADA
IN BELGIUM (f)

(a) *If more than one inventor delete the words "one of" and add (s) to word "Inventor". A separate oath for each application executed.*
(b) *Delete to end of paragraph if no claim for priority is made or if no patent issued prior to filing this application.*
(c) *Delete paragraph if no claim for priority is made.*
(d) *Signature of inventor.*
(e) *Signature of person administering oath. Official Seal must be affixed.*
(f) *Official capacity of person administering oath. Notary Public, Judge or other officer for taking affidavits.*

Important: The oath must be sworn not earlier than thirty days before the date of the filing of the petition. If the Jurat is in any other language than English or French a certified translation must be supplied. Legalization is not necessary.

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(211

Fig.1

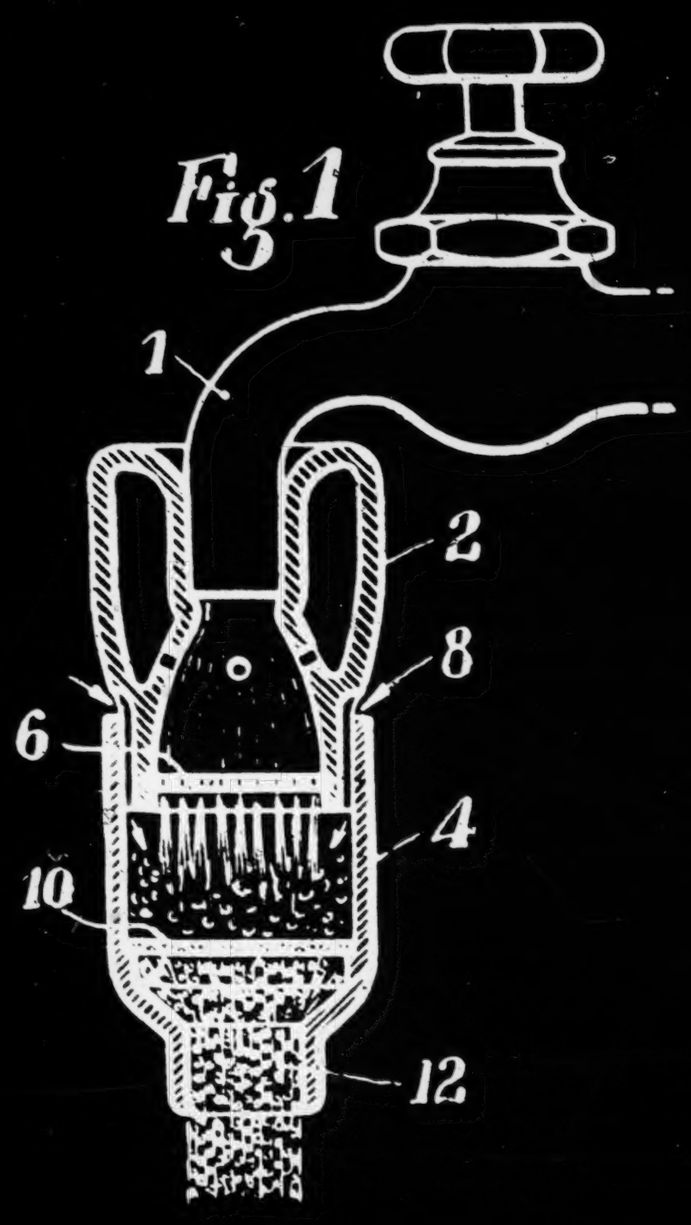

Fig.4

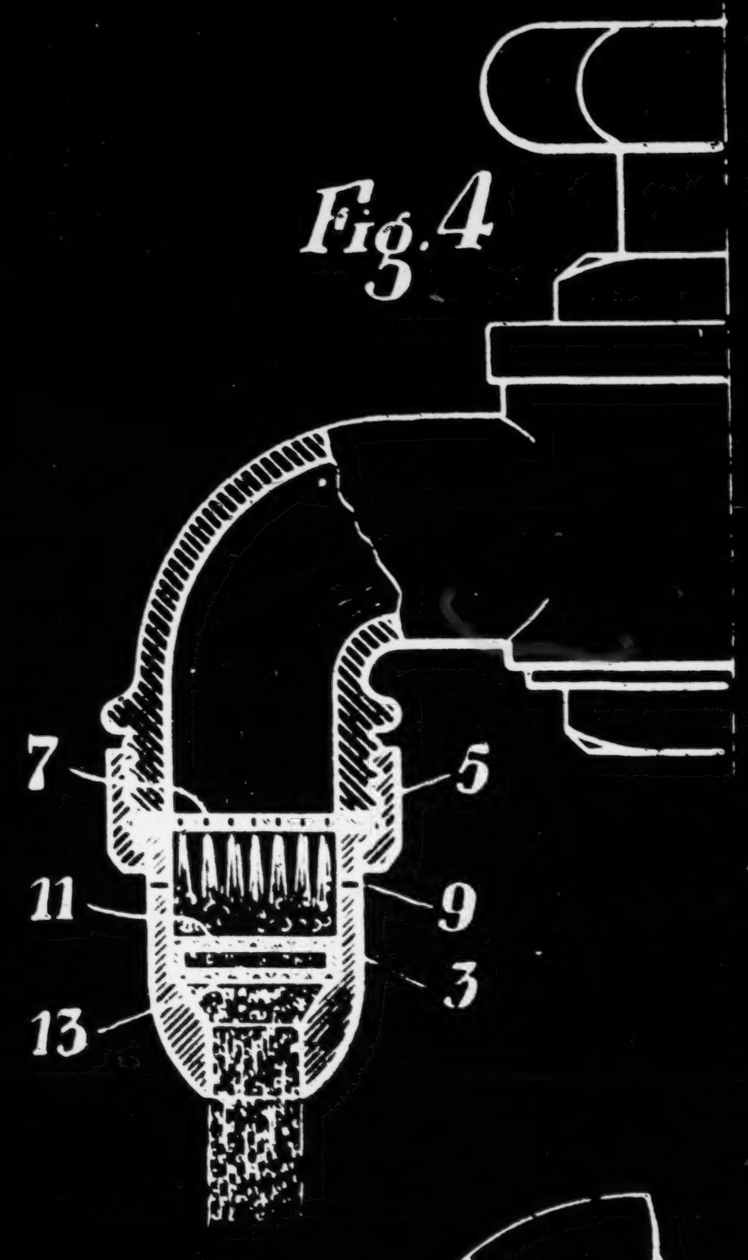

Fig.2

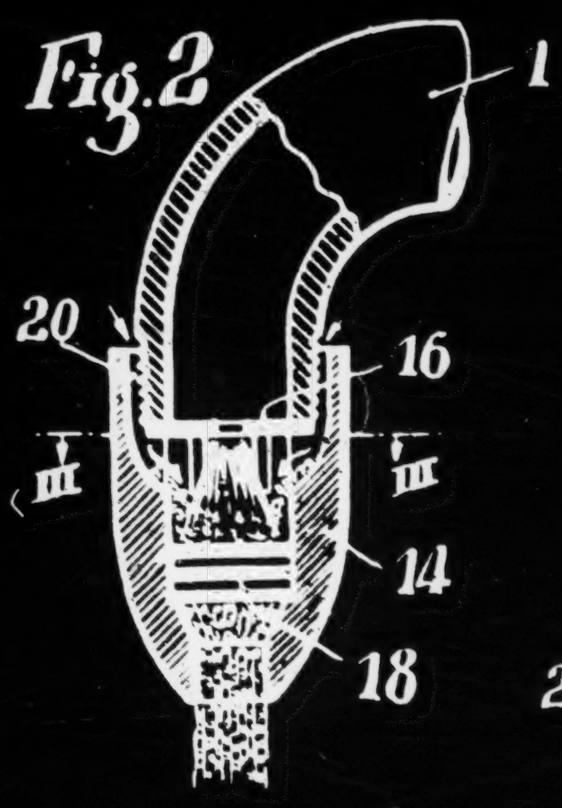

Fig.5

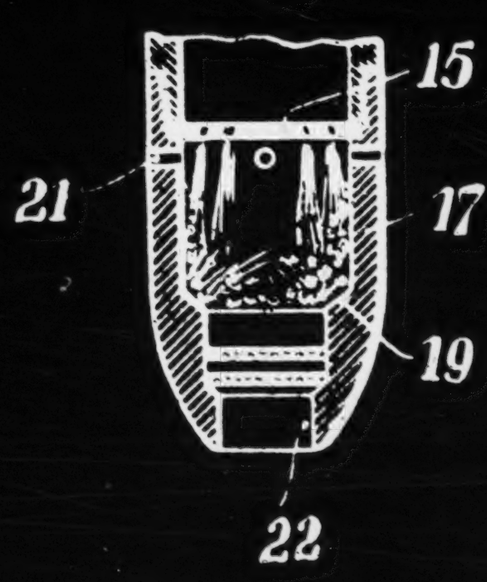

Fig.6

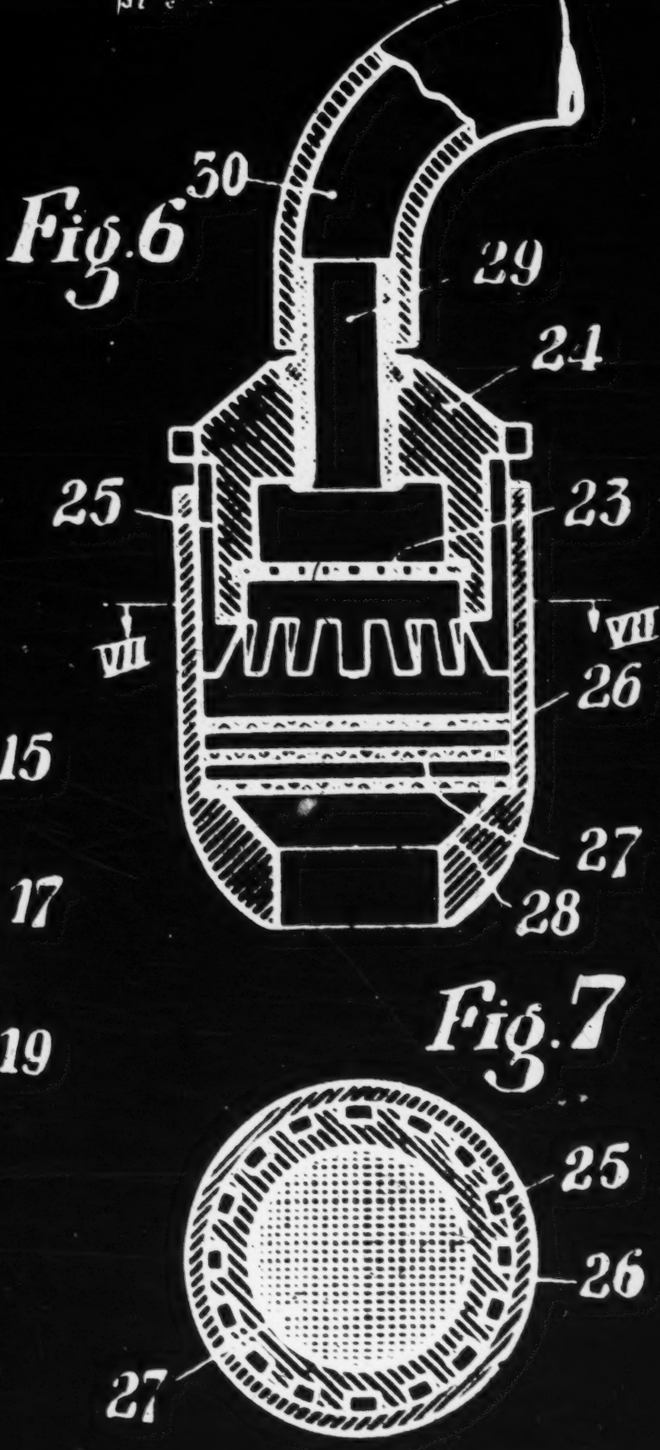

Fig.3

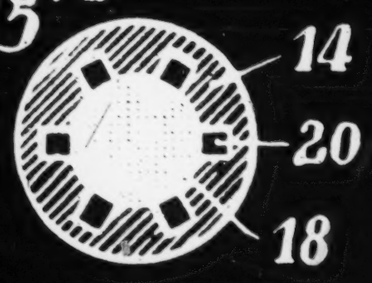

Fig.7

Witnesses :

Certified to be the drawings referred to in the specification hereunto annexed.
Signed at MONTREAL, Can. Nov. 14, 1939.

Inventor
Elie AGHNIDES

By Marion & Marion
Attorneys.

PATENTS & COPYRIGHT OFFICE
NOV 16 1939
ACCOUNTANT

M A R I C N & M A R I O N

Patent Attorneys

Postal Address
(Box 390, Station B)

1255 University Street,

MONTREAL, Can.

November 14, 1939.

TO THE COMMISSIONER OF PATENTS,

OTTAWA,

ONT.

SIR,

Attached herewith please find the necessary papers for a patent application, the particulars of which appear below, with a check to cover the filing fees.

....

....

Priority is claimed as follows: ... .

....

....

Yours respectfully,

Marion & Marion

Case No.

Name of Inventor: ELIE AGHNIDES Attorneys.

Title of Invention: Device for intimately mixing air with water flowing under pressure.

Priority Data (if any) none

Fee: $ 15.00

DUPLICATE

CANADA

No. 909135

Department of the Secretary of State — Patent and Copyright Office

Département du Secrétaire D'État — Bureau des brevets et droits d'auteur

Received from / Reçu de: Elie Aghnides — November 15, 1939

the sum of / la somme de: Fifteen Dollars

in payment of the fee on / en paiement des honoraires dûs sur: Filing

$ -15.00 (2401)

Serial No. / No. de Série

M. J. Birchall

Accountant / Comptable

Canadian File Wrapper 2 App. 337

490112

PATENT AND COPYRIGHT OFFICE

COMMUNICATIONS SHOULD BE ADDRESSED
THE "COMMISSIONER OF PATENTS"
"OTTAWA"
WHEN WRITING ON THIS SUBJECT REFER TO
SERIAL NUMBER OF APPLICATION

CANADA

PATENT OFFICE

OTTAWA, November 22, 1939

Applicant Pio Aglnides

Title of invention Device for Intimately Mixing Air with Water Blowin under Pressure

Filing date Nove[illegible] 18, 1939

Serial number 468,775

Gentlemen:

You are hereby advised of the filing of the above application for patent.

Your obedient servant,

J T Whitehell
Commissioner.

To [illegible]

[illegible]

[illegible]

CIRCULAR No. 1
1[illegible]-17-7-39

COMMUNICATIONS SHOULD BE ADDRESSED
"THE COMMISSIONER OF PATENTS"
"OTTAWA"
WHEN WRITING ON THIS SUBJECT REFER TO SERIAL NUMBER OF APPLICATION

PATENT AND COPYRIGHT OFFICE

CANADA

PATENT OFFICE

OTTAWA, November 25, 1939

Serial No. 468776

Filed Nov. 15, 1939

Applicant Elie Aghnides

Title Device for Intimately Mixing Air with Water Flowing under Pressure

Gentlemen;

Referring to the above application I beg to inform you that the oath executed September 19, 1938 is not acceptable under Rule 13. A new oath is required.

Attention is respectfully directed to Rule 21 of the Rules, Regulations and Forms, 1935.

Your obedient servant,

J T Mitchell

Commissioner

To Messrs. Marion & Marion,
Box 390 Station "B",
Montreal, Que.

CIRCULAR 2
2-8-38

P. O. BOX 368, STATION "B"

MONTREAL, May 9th, 1947

PATENT & COPYRIGHT OFFICE
MAY 10 1947
ACCOUNTANT

HON. COMMISSIONER OF PATENTS,

O T T A W A ,

Ont.

re: Elie AGHNIDES - Can.Pat.Appln. No. 468,776 - "DEVICE FOR INTIMATELY MIXING AIR WITH WATER FLOWING UNDER PRESSURE."

S I R :-

As requested by your letter of November 25th, 1939, attached herewith please find a new Oath.

It is to be noted that this application became abandoned through failure to complete the same within twelve months from its date of filing, namely on or before November 15th, 1940. We also submit herewith an affidavit executed by the applicant, showing that the delay in completing the application, is obviously due to war conditions, and consequently it is respectfully asked that it be reinstated under the authority of Section 9 of the Patents, etc., Emergency Order, 1939.

Yours respectfully,

MARION & MARION

Per: [signature]

Attorneys.

JAB/MD.

ENCL.

49011

Time to complete papers
Extension of time to May 10, 1947
given under authority of Sec. 9
of The Patents, Designs, Copyright
and Trade Marks (Emergency) Order,
1939. J. T. Mitchell
Commissioner

5/5/47

Affidavit

I Elie AGHNIDES, citizen of Greece, formerly 14 Blvd. de Waterloo, Brussels, Belgium and presently 527 Lexington Ave. New York 17, N.Y., United States of America, hereby depose upon oath and state as follows:

that it was beyond my control to follow the application No. 468,776 filed on November 15th 1939 in Canada, for "Device for Intimately Mixing Air with Water Flowing under Pressure";

that I left Belgium in October 1939 and my country was invaded by Italy in October 1940;

that due to war my funds were blocked and communication with my patent attorney in Belgium was impossible;

that when after the end of the war I decided to continue the above mentioned patent application in Canada No. 468,776 and wrote to my Belgian patent attorney Mr. D. Jeunehomme, Office des Inventions, 63 Blvd. E. Jacqmain Brussels, Belgium;

that due to war the Office des Inventionswas disorganized and many documents were lost;

that further delay was caused by the sudden death of Mr. D. Jeunehomme and because his successors Office Kirkpatrick in Brussels, Belgium informed me only recently that I should write directly to Messrs. Marion & Marion of Montreal, Canada who were the Canadian Agents of the Office des Inventions and possessed all the documents relative to the above mentioned patent application.

In witness whereof I have signed this affidavit.

SWORN BEFORE ME AT
New York. N.Y. this
7 day of May, 1947
Gertrude M. Remier

Elie Aghnides

GERTRUDE M. REIM[illegible]
Notary Public in the State of New York
Residing in Queens County
Queens Co. Clk's No. 2977
[illegible]

Canadian File Wrapper 2 App. 341
490112

P. O. BOX 368, STATION "B"

MONTREAL, May 16th, 1947.

HON. COMMISSIONER OF PATENTS,

O T T A W A ,

Ont.

re: Elie AGHNIDES - Can.Pat.Appln.
No. 468,776 - DEVICE FOR INTIMATELY MIXING AIR WITH WATER FLOWING UNDER PRESSURE.

S I R :-

The applicant desires to incorporate in the above application, claims corresponding to his United States patent or patents as the case may be.

Consequently, it is respectfully asked that one of the duplicate copies of the specification, claims and drawings on file, be sent to us, so that a proper amendment of the claims may be made thereto and filed in accordance with applicant's request.

Yours respectfully,

MARION & MARION

Per: J. A. Hostein

Attorneys.

J.B/M.D.

2 App. 312 Canadian File Wrapper

PATENT AND COPYRIGHT OFFICE

COMMUNICATIONS SHOULD BE ADDRESSED
"THE COMMISSIONER OF PATENTS"
"OTTAWA"
WHEN WRITING ON THIS SUBJECT REFER TO
SERIAL NUMBER OF APPLICATION

CANADA

PATENT OFFICE

OTTAWA, May 30, 1947

Application Serial No. 468,776
Applicant Elie Aghnides

Gentlemen,-

I have the honour to acknowledge the receipt of your letter of the 16th instant,

and in reply to inform you that as requested, I am returning herewith the duplicate papers in the above application. I may point out, however, that this application has become completely abandoned, the required oath not having been filed within the prescribed period.

Your obedient servant,

J. T. Mitchell
Commissioner

To Messrs. Marion & Marion,
Box 368, Station "B",
Montreal, Que.

CIRCULAR NO. 6
10 000 - 4-47

Canadian File Wrapper 2 App. 343
490712

MARION & MARION
(ESTABLISHED 1902)
PATENT ATTORNEYS
SOLLICITEURS DE BREVETS D'INVENTION.

RAYMOND A. ROBIC
J. ALFRED BASTIEN

CASIER NO
P. O. BOX 368 STA. "B"
MONTREAL, 2.

June 16th, 1947

PATENT & COPYRIGHT OFFICE
JUN 17 1947
ACCOUNTANT

HON. COMMISSIONER OF PATENTS,
O T T A W A ,
Ont.

re: ELIE AGHNIDES - Can.Pat.Appln. No. 468,776 - "DEVICE FOR INTIMATELY MIXING AIR WITH WATER FLOWING UNDER PRESSURE".

S I R :-

By your letter of the 30th ult., we are advised that this application is completely abandoned.

Before filing an amendment, we would like to know if this decision was rendered after consideration of our petition dated May 9th, accompanied with an affidavit praying for the reinstatement of this case under Section 9 of the Patents, Emergency Order, 1939.

Thanking you for an early reply, we are,

Yours very truly,

J. A. Bastien.

JAB/MD.

468,776

August 26, 1947.

Gentlemen,-

Referring to application for patent Serial No. 468,776 in the name of Elie Aghnides, for "Device for Intimately Mixing Air with Water Flowing under Pressure", I beg to advise that in view of the statements contained in the affidavit received with your letter of May 9th, 1947, the time within which to complete the papers in the case has been extended under authority of Section 9 of the Emergency Order.

The application has been referred to the examiner for consideration.

Your obedient servant,

Commissioner of Patents.

Messrs. Marion & Marion,
Box 368, Station "B",
Montreal, Quebec.

Canadian File Wrapper 2 Apr. 45
490.12

MARION & MARION
(ESTABLISHED 1892)
PATENT ATTORNEYS
SOLLICITEURS DE BREVETS D'INVENTION

RAYMOND A. ROBIC
J. ALFRED BAZIEN

CABLE ADDRESS P. O. BOX 368 STA. "B"
MONTREAL, 2.

COPYRIGHT OFFICE
SEP 8 1947
ACCOUNTANT

September 5, 1947.

IN THE CANADIAN PATENT OFFICE

In the matter of the application of

Elie AGHNIDES

For a patent upon: "DEVICE FOR INTIMATELY MIXING AIR WITH WATER FLOWING UNDER PRESSURE"

Filed Nov. 15, 1939: Ser.No. 468,776.

AMENDMENT BEFORE ACTION

HON. COMMISSIONER OF PATENTS,
O T T A W A, Ont.

SIR:

Herewith are returned the duplicate specification papers for the above application, together with new claims in triplicate to be substituted for those of record.

A

R E M A R K S

Applicant desires to change the title of the present invention to "FLUID MIXING DEVICE", and it is respectfully requested that this title be substituted for that of record.

Considering the nine claims presented herewith by applicant, it is pointed out that these claims are identical with those of United States Patent Nos. 2,210,846 and 2,316,832 to applicant covering the present invention.

The first of the above patents contains claims corresponding to new claims 1-5, and the second contains claims corresponding to new claims 6-9.

The application resulting in United States Patent No. 2,210,846 was filed December 31, 1937. Against this application the Examiner cited the patents to Haisman et al, British 7,005 of March 22, 1913 and to Friedrich U.S. 2,003,184 of May 28, 1935.

Elie Aghnides. Ser. No. 468,776.

On June 18th, 1940, the United States Board of Appeal reversed the Examiner's decision and discarded both the above references, and a patent was issued August 6, 1940.

The application resulting in U.S. Patent No. 2,316,832 was filed on April 5th, 1940, as an improvement in applicant's original device and was granted on April 20th, 1943.

The devices covered by the claims of these two patents are disclosed both in structure and function in the present Canadian application, and it is therefore believed that the inclusion of the present claims renders this application allowable.

A favourable action is accordingly solicited.

RESPECTFULLY SUBMITTED,

Elie AGHNIDES

by: Marion & Marion
Attorneys.

LW:EF
Enc.

Having now fully described my said invention, what I claim and desire to secure by letters patent is:

1. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper injector portion, a dividing and mixing part and an outlet for the jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

2. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper injector portion, a dividing and mixing part and an outlet for the jet, wherein the dividing and mixing part is made of superposed perforated screens, the whole of which answers at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the

suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

3. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper injector portion, a dividing and mixing part and an outlet for the jet, wherein the dividing and mixing part is made of staggered, but non contacting perforated screens, the whole of which answers at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm,

b) the total height of these passages without taking into account the intervals between the staggered screens exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

4. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper injector portion, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of a least a perforated screen answering at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30

times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

5. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper perforated plate forming part of an injector portion, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

6. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper injector portion formed of a transverse plate with a single central hole, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular

section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

7. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper plate perforated at its periphery only and forming part of an injector portion, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following conditions:

A

a) the passages across the dividing member, at the place where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm,

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

8. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper perforated plate forming part of an injector portion, a restricted passage above said perforated plate, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following

fundamental conditions :

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm. ;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above ;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

3. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper perforated plate forming part of an injector portion, a uniformly perforated plate above this injector portion, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions :

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm ;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above ;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

4. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper injector portion formed of a transverse plate with

a single central hole, a uniformly perforated plate above said plate, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

11. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper plate perforated at its periphery only and forming part of an injector portion, a uniformly perforated plate above said plate, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

12. Device for intimately mixing air with water flowing

under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper injector portion, a dividing and mixing part and an outlet for the jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets., and wherein the body of the device comprises peripherical internal projections below the injector portion, and a restricted outlet for the reception of the dividing and mixing means.

13. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper perforated plate forming part of an injector portion tightened between the upper side of the device and the faucet to which the device is connected, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

14. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper perforated plate forming part of an injector portion maintained in a groove of the device's body, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

15. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper perforated plate forming part of an injector portion maintained in a connector between the device and a faucet, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three

following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

16. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper injector portion, a dividing and mixing part and an outlet for the jet, wherein the dividing and mixing part is made of superposed perforated screens maintained in a rigid ring, the whole of which answers at one and the same time to the three following fundamental conditions:

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

17. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper injector portion, a dividing and mixing part and an outlet for the jet, wherein the dividing and mixing part is

made of staggered, but non contacting perforated screens, maintained in a rigid ring, the whole of which answers at one and the same time to the three following fundamental conditions :

a) the passages across the dividing member at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm ;

b) the total height of these passages without taking into account the intervals between the staggered screens exceed 30 times the value of the diameter specified at a above ;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets.

18. Device for intimately mixing air with water flowing under pressure, for obtaining a coherent jet wherein a large proportion of air is imprisonned in form of very small bubles tending to remain in suspension in the jet, this device comprising an upper perforated plate forming part of an injector portion, a dividing and mixing part and a restricted outlet for the issuing jet, wherein the dividing and mixing part is made of at least a perforated screen answering at one and the same time to the three following fundamental conditions :

a) the passages across the dividing member, at the plan where their section is smallest, must correspond to a circular section of a diameter included between 0,05 and 2,5 mm ;

b) the total height of these passages must not exceed 30 times the value of the diameter specified at a above ;

c) these passages must be so close together that the suction zone of each jet coming out of any passage whatever is at least tangent with the suction zone of the neighbouring jets, the dividing and mixing part being supported on an internal shoulder of the device's body ; and the perforated plate of the injector portion being supported by a ring carried by the dividing and mixing part, holes in the upper part of said ring, holes in

the device's body, and a connecting part between a faucet and the device's body, whereby the tightening of this device's body on this connecting part produces the tightening of the dividing and mixing part, of the injector portion and of the ring between the mixing part and the injector portion.

CANADIAN PATENT OFFICE

2 App. 358 Canadian File Wrapper

490112

MARION & MARION
(ESTABLISHED 1892)
PATENT ATTORNEYS

SOLLICITEURS DE BREVETS
D'INVENTION.

RAYMOND A. ROBIC
J. ALFRED BASTIEN

CASIER No
P. O. BOX 368 STA. "B"

MONTREAL, 2 October 12th, 1949.

HON. COMMISSIONER OF PATENTS .

OTTAWA

ONT.

RE:-ELIE AGHNIDES - Can.Pat.App.Ser. No. 468,776 - Filed November 15th, 1939 for "DEVICE FOR INTIMATELY MIXING AIR WITH WATER FLOWING UNDER PRESSURE".

S I R :-

Kindly advise us when an action may be expected in the above entitled application.

YOURS RESPECTFULLY,

MARION & MARION,

Attorneys.

JOB/LB.

Elie Aghnides,

per

Messrs. Marion & Marion,
Montreal, Que.

Patent Office
CANADA

Ottawa NOV 8 1950

Please find papers herewith enclosed, and below a communication from the Examiner in charge of your application, Serial No. 468,776 *for*

DEVICE FOR INTIMATELY MIXING AIR WITH WATER FLOWING UNDER PRESSURE

Any communication respecting this application should give the serial number and should be addressed to "The Commissioner of Patents, Ottawa."

J T Mitchell
Commissioner

It is noted that the present claims conform to Applicant's two United States Patents, Nos. 2,210,846 and 2,316,832. However, a discrepancy is noted in the convention dates upon which the Canadian and United States cases are based. The Canadian application claims priority in view of Holland and Swedish applications of June, 1939. The United States bases priority on a Belgium application filed in December 1934. In view of the requirements of Section 27 subsection 1 of the Patent Act, an explanation of the above circumstances is requested.

The Applicant is further requested to advise this Office of the status of the corresponding Belgium case of December, 1934 -- if this application has issued to patent, the patent number and date of issue are required.

The present application is refused in view of Applicant's British Patent 468,687, dated July 6, 1937. Attention in this regard is directed to Section 27 subsection 2 of the Patent Act.

Division 8

2 App. 360 Canadian File Wrapper

MARION & MARION
(ESTABLISHED 1892)
PATENT ATTORNEYS
SOLLICITEURS DE BREVETS D'INVENTION.

RAYMOND A. ROBIC
J. ALFRED BASTIEN

CABIER NO
P. O. BOX 368 STA. "B"
MONTREAL, 2, MAY 5 1951

IN THE CANADIAN PATENT OFFICE

In the matter of the application of
ELIE AGHNIDES
For a patent upon an improvement in
"DEVICE FOR INTIMATELY MIXING AIR WITH WATER FLOWING UNDER PRESSURE"
Filed November 15th, 1939; Ser.No. 468,776

AMENDMENT

THE HON. COMMISSIONER OF PATENTS,
O T T A W A,
ONT.

S I R :-

This is in response to Official Action dated November 8th, 1950 in the above matter. The duplicate papers are returned herewith.

- R E M A R K S -

The priority question raised by the Examiner is based, of course, on the foreign applications claimed as Convention dates in the Oath filed with the present specification, namely:

Holland, June 22nd, 1939
Sweden, June 26th, 1939.

Consequently, said applications were subsequent to the filing of the United States patent No. 2,210,846 which, at the date of filing, claimed the Belgian application of 1934.

There is an important fact to remember, however; the said Belgian 1934 application did not disclose fully the bubbly-stream principle disclosed in Holland, Sweden, the United States patent No. 2,210,846, the instant Canadian case and British Specification No. 625,084.

It is only in December 1937 that the ways and means of making a bubbly-stream were disclosed when the United States text (application No. 182,884) was rewritten, although the Convention Belgian application did mention the emulsion of air in a water stream.

Therefore, the priority claims in the present case are correct and support properly the instant disclosure: it is the Belgian Convention which, in the United States patent No. 2,210,846 confuses the issue because, actually, said Belgian case does not teach the bubbly-stream as it is known to-day.

B

The same remarks apply also to the British Specification No. 468,687 which was filed December 4th, 1935, prior to the first disclosure of the bubbly-stream in United States, December 1937.

As a matter of fact, the British Examiner, during prosecution of British Patent No. 625,084, embodying the principle presently claimed, did oppose the Applicant's prior patent No. 468,687 as pertinent art. Upon presenting proper factual arguments, and submitting a model showing the differences between the two applications, the citation was withdrawn and patent No. 625,084 issued.

Applicant is prepared to submit this exhibit to the Canadian Examiner, if necessary and, as a matter of interest, reproduces below textually the argument presented to the British Examiner:

"The British patent specifies on page 2, line 7, that the device has "an atomizing and mixing portion", and on lines 11 and 12, that "the particles of liquid and air in intimate contact with each other even after issuing from the said device". This statement is confirmed in claim 1 of this British patent, as well as the fact that the pressure is uniformly distributed throughout the cross section of the stream. On line 20 of page 2, it is again specified that the perforated plate, or plates, atomizes the air and liquid. On page 3, lines 7 and 8, it is specified that with soap this device produces a very foamy emulsion. It is clear that atomization of a fluid or emulsion of a fluid means reduction of that fluid into particles of extremely small size. Such particles escape to the law of gravitation. For instance, when air is atomized or emulsified into water, the water will become gray and stay gray for awhile, even though the great difference in density of air and water should create an instant separation of the two fluids. Because such instant separation does not take place, Aghnides' patent specifies in the claim that the contact between air and water is intimate "even after issuing from the device". Another statement in the patent, which illustrates well how little air is drawn through the device and how well the air drawn is atomized, proves that the device is suitable for drawing beer (page 3, lines 12 and 13). Indeed, if the amount of air drawn through the device was substantial, and the particles formed by said air were big enough to form bubbles instead of being mere emulsion particles, it would be utterly impossible to draw any beer through this device because, due to the froth-producing property of the beer, a substantial amount of air, divided into particle size forming bubbles, would fill the glass with froth and nothing else.

B

The fact that the patent issued did not have the purpose to mix a great volume of air with water, which merely emulsified air in the water -- and the volume of air that can be emulsified in the water is very limited -- is proven also by the character of the drawings shown in this patent. Thus, it will be seen that in the abandoned figure 6 there was a water softener in the path of the air and the water The water softener obviously presented such resistance that only very little air could be entrained through by the force of the water under pressure. Likewise, in figures 2, 3, 4 and 5, the distance between the injector portion (element 5) and the mixing portion is relatively speaking great. This means that, by the time the water strikes a perforated plate, it has already lost a part of its force, and less air is therefore entrained through the perforated plates.

Aghnides discovered that if the device of patent 468,687 is proportioned differently, even though it would appear pictorially the same, it will produce an entirely different result. This discovery is described in his application 18571/38. (Application 18571/38 matured into the British patent No. 625,084). In this application the new principle is fully explained and the resultant jet is white (page 2, line 25). The new jet is white in color because the amount of air contained in the jet is considerable, and, on the other hand, it is specified that the air bubbles (page 2, line 17) have " a tendency to remain in suspension in the jet". It is clear, or, at least it is a fact, that it is a question of bubbles and also a question of a white stream, and these statements tell to those skilled in the art that the bubbles will not stay in "intimate contact with each other long after issuing from the said device".

Applicant claims that it is not obvious for one in possession of a device as per his patent 468,687 that he may so modify the device as to transform it into one that delivers bubbly-white stream. Indeed, this discovery alone would not have any meaning if the applicant had not discovered that the bubbly-white stream has extraordinary and new properties such as those described in the attached folder.Bubbles have been seen by millions of people during centuries, but no-one suspected their properties so as to conceive a very practical and simple means, as those described in said application, for the benefit of the industry and of the public at large. Those chemists and engineers often saw laboratory water pumps delivering air and water mixed and some bubbles accidentally created, but none even suspected how valuable those bubbles could be."

It is believed that the present explanation will convince the Examiner that the present application is correctly based on the proper convention dates, and that the apparent discrepancy of the United States patents is due to special reasons not specifically applicable to the instant matter.

Favorable reconsideration is solicited.

RESPECTFULLY SUBMITTED,

ELIE AGHNIDES,

BY:

Marion & Marion
Attorneys.

JOB/LB
ENCL:
MAY 4TH, 1951.
MONTREAL CANADA.

EXCLUSIVE CONNECTION WITH WESTERN UNION CABLE SERVICE

CANADIAN NATIONAL TELEGRAPHS

J R WHITE GENERAL MANAGER
TORONTO

STANDARD TIME

COMMISSIONER OF PATENTS
OTTAWA
52

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271 :CDN BLDG OTTAWA=

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:MARION AND MARION=

IN CONNECTION WITH WESTERN UNION CABLE SERVICE
EXCLUSIVE AVEC WESTERN UNION CABLE SERVICE

FORM 6102 E

CANADIAN NATIONAL TELEGRAPHS

W. M. ARMSTRONG
GENERAL MANAGER — GÉRANT GÉNÉRAL
TORONTO

CLASS OF SERVICE DESIRED GENRE DE SERVICE	
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DAY LETTER LETTRE DE JOUR	
NIGHT MESSAGE DÉPÊCHE DE NUIT	
NIGHT LETTER LETTRE DE NUIT	

PLACE X OPPOSITE SERVICE DESIRED
INDIQUEZ PAR UN X LE GENRE DE SERVICE DÉSIRÉ

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Send the following message, subject to the terms on back hereof, which are hereby agreed to
Veuillez expédier la dépêche suivante aux conditions mentionnées au verso auxquelles je consens par les présentes

The Patent Office,
Ottowa, Ontario.
May 19, 1952.

Messrs. Marion & Marion,
Box 368, Station "H",
Montreal, Quebec.

RE APPLICATION FOUR SIX EIGHT SEVEN SEVEN SIX ACTION MAY BE

EXPECTED WITHIN WEEK

I. C. Whillans
Acting Commissioner of Patents.

COLLECT.

IS YOUR MESSAGE COMPLETE? EXTRA WORDS COST ONLY A FEW CENTS.
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Canadian File Wrapper 2 App. 367

Elie Agnnides, Esq.

per:

Messrs. Marion & Marion,
Box 368, Station "B",
MONTREAL, Quebec.

Patent Office
CANADA

Ottawa, JUN 4 1952

Please find below a communication from the Examiner in charge of your application, Serial No. 468,776 ***for***

"DEVICE FOR INTIMATELY MIXING AIR WITH WATER FLOWING UNDER PRESSURE"

Any communication respecting this application should give the serial number and should be addressed to "The Commissioner of Patents, Ottawa."

J. W. McHugh
Commissioner

Applicant's letter of May 4, 1951, has been carefully considered.

Present claims 1 to 5 inclusive, correspond to the claims of Applicant's United States Patent No. 2,210,846, which bears a filing date of December 31, 1937.

In view of the requirements of Section 27(1) of the Patent Act, the Applicant is not entitled to priority with regard to Holland and Swedish applications of 1939. Reading from Section 27(1), the Act states that an inventor may claim convention rights "--- provided the application in this country is filed within twelve months from the earliest date on which any such application was filed in such other country ---". This has not been the case in the present instance, and hence, the Applicant is not entitled to the priority date as claimed herein.

Referring to the previous Official Action of November 8, 1950: attention is directed to paragraph 2, re the status of the corresponding Belgium case. This information was not supplied in the response of May 4, 1951, and is again requested.

Division in accordance with Section 37(2) of the Act, is required between claims 1 to 5 inclusive on the one hand, and claims 6 to 9 inclusive, on the other. Claims 6 to 9 submit an improvement on the original device, said improvement being considered a second invention. Further, at present both groups of claims are not covered by a proper broad claim as required by Rule 70 of the Patent Rules, 1948.

Revision is required.

DIVISION 7.

AP

30M—5-51

2 App. 368 Canadian File Wrapper

430112

MARION & MARION
(ESTABLISHED 1892)
PATENT ATTORNEYS

SOLLICITEURS DE BREVETS
D'INVENTION.

RAYMOND A. ROBIC
J ALFRED BASTIEN

CASIER NO
P. O. BOX 368 STA. "B"

MONTREAL, 2, ... 195

IN THE CANADIAN PATENT OFFICE

In the matter of the application of)
ELIE AGHNIDES)
For a patent upon an improvement in)
"DEVICE FOR INTIMATELY MIXING AIR WITH) A M E N D M E N T
WATER FLOWING UNDER PRESSURE")
Filed Nov.15,1939;Ser.No.468,776)

HON. COMMISSIONER OF PATENTS,
OTTAWA, ONT.

S I R :

In answer to Official Action dated June 5th, 1952 please find enclosed herewith a new preamble in which the title reads "FLUID MIXING DEVICE" and new pages 1 and 4 in duplicate.

Please also delete page 6 of the description, Figures 8 and 9 of the drawings and claims 6, 7, 8 and 9.

- R E M A R K S -

The subject matter relating to Figures 8 and 9 is now cancelled from the present application as it has been filed in divisional application Serial No. 637,830 on October 9th, 1952 in accordance with the division requirement of the Examiner.

Canadian File Wrapper 2 App. 369
490112

Applicant hereby abandons the priority dates of the Dutch and Swedish applications of June 22nd, and June 26th, 1939 respectively.

The Belgian case filed December 8th, 1934 has been granted on January 31st, 1935 as Belgian Patent No. 406,702.

Belgian Patent No. 406,702 does not describe the bubbly stream as disclosed in the present case and consequently cannot be opposed to the present application.

The present case is believed to fully meet the requirements of Section 26 of the Patent Act, 1935.

The foreign cases corresponding to the present application are as follows:

U.S. Patent No. 2,211,846 issued Aug. 6th, 1940
Dutch Patent Application filed June 22nd, 1939
Swedish " " " June 26th, 1939
British Patent No. 625,084 issued Sept. 6th, 1949

The actual or eventual issue dates of these cases are all posterior to Applicant's filing date of November 15th, 1939.

The present application is consequently believed in condition for allowance.

A favourable action is accordingly solicited.

Respectfully submitted,

ELIE AGHAIDES

By: Marion & Marion

Attorneys

Encl.
October 29th, 1952
MONTREAL, CANADA
EL/DJ

TO ALL WHOM IT MAY CONCERN :

Be it known that I, Elie A[illegible]nides, a citizen of the Greek Republic and resident of Brussels, Belgium, have invented certain new and useful Improvements in and relating to devices for intimately mixing air with water flowing under pressure, of which the following is a specification :

This invention relates to apparatus for the intimate mixture of the ambient air with water flowing under pressure, and consisting of an upper part forming injector for the intake of the air by the water under pressure, and an outlet, and comprising between this outlet and the injector a dividing mixer through which the two fluids water and air are forced to pass. According to the purpose of the invention, such apparatus are essentially meant to be fitted at the outlet of a tap for the distribution of the town's water supply.

In certain known contrivances of this type, the dividing mixer is made up of projections, baffles, stops, or other radial devices, or otherwise disposed, on which the jets of both fluids come to be broken up so as to determine a more or less intimate intermixture of both fluids. In these devices, the jet leaving the apparatus has no conesion, it is exactly like an ordinary water jet in appearance, the air which is carried escaping immediatly at the outlet.

In other known apparatus, the dividing mixer consists of a plate with relatively large perforations, which gives the same result as that obtained by means of projections or of baffles.

Further, a device of this type is known in which the divider is formed by at least one plate with extremely fine holes, of a capillary character ; these holes which are very tiny, determine according to the characteristic features of this apparatus, a real

quantity of air carried away decreases, and the apparatus loses some of its interest.

The third condition aims at obtaining a coherent well and plain jet, in which the air bubbles are imprisonned in the jet ; it equally aims at decreasing the resistance offered by the mixing means.

These three essential conditions can give birth to quite a series of interesting embodiments, either applied by themselves, or in combination with other constructive characteristics, as will be brought out in the following description made with reference to the annexed drawings, in which :

Fig.1 is an axial section of a first embodiment.

Fig.2 is the same section of a variant.

Fig.3 is a section according to III-III of fig.2 ;

Fig.4 is a section of another variant,

Fig.5 is a section or still another variant,

Fig.6 is a section of a variant to be connected with a flexible.

Fig.7 is a section according to VII-vII of fig.6.

Figs,8 and 9 are section of two other variants.

Refering to Fig.1, 1 designates an ordinary household tap, and 2 is a connection for the tap ; this connection is of known construction, 4 is the body of the mixing-divider. The perforated plate 6 allows the water to pass into the chamber 4 in the form of a large number of little jets. A series of passages 8 are provided for the admission of the external air into the chamber 4, through the action of the jets coming out of 6. 10 designates a screen or sieve at the lower part of the body 4, above a narrowed outlet 12. The screen 10 consists of a sieve with passages, the section of which corresponds with that of a circle the diameter of which is included between 0,05 mm. and 2,5 mm., and which answers to the three essential conditions previously indicated. The contraction 12 at the outlet also offers

On Fig.8, the envelope 31, provided with lateral holes for the admission of air is screwed by means of its adge 32 on to a metallic connection 33 which is itself screwed on to the extremity of the tap 34. The three sieves 39 simply superposed or separated by means of rings 40, are surmounted by a ring 43 provided with notches 44 for the passage of the external air admitted through the holes of the envelope 31 ; on this ring 43 is placed the perforated plate 35. By the screwing up of the part 31, the assembly of the sieves 39, rings 40 and the ring 43 is tightened up and properly immobilised, as is shown in the drawing. This assembly allows an easy removal of the sieves for cleaning purposes. A characteristic feature of this variant is also the contraction of the water passage, in the connector 33, above the plate 35. This contraction has as object the concentration of the water column towards the axis, so as to obtain a greater velocity at the centre when leaving the plate 35, so as to render the repartition of the air sucked in more uniform over the whole section of the jet before its arrival at the divider 39.

The variant shown in Fig.9 is still provided with this contraction combined with a perforated plate 36 above the plate 35. The part played by this plate 36 is whilst retaining the effect of the contraction 37, to better distribute the water over the section of the chamber 31. This second plate 36 can furthermore be applied to the examples shown in Figs. 1 and 4 for instance without the contraction 37. In this example, the divider consists of three sieves 41 which are superposed, caught in a ring 42. One will understand that, in the case of several sieves, either superposed or spaced, these may, in one embodiment or the other, be mounted in a common ring so as to form a removable unit.

6. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a foraminous member upstream the apertured diaphragm.

7. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice upstream the apertured diaphragm.

8. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, an apertured diaphragm at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice and foraminous member upstream the apertured diaphragm.

9. A device for producing a jet of water containing air bubbles comprising a chamber the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, superposed apertured diaphragms at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the water delivered from the apertured diaphragms and means in the path of the stream of water after it leaves the apertured diaphragms and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles.

'468 176
12

Fig.8

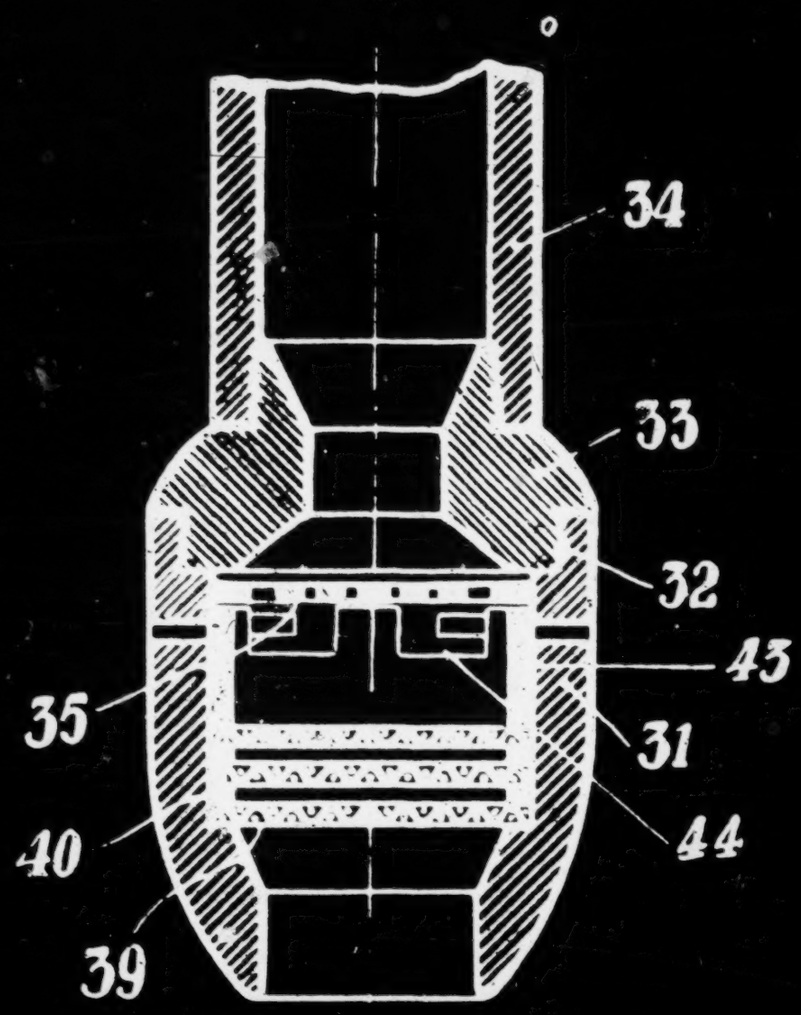
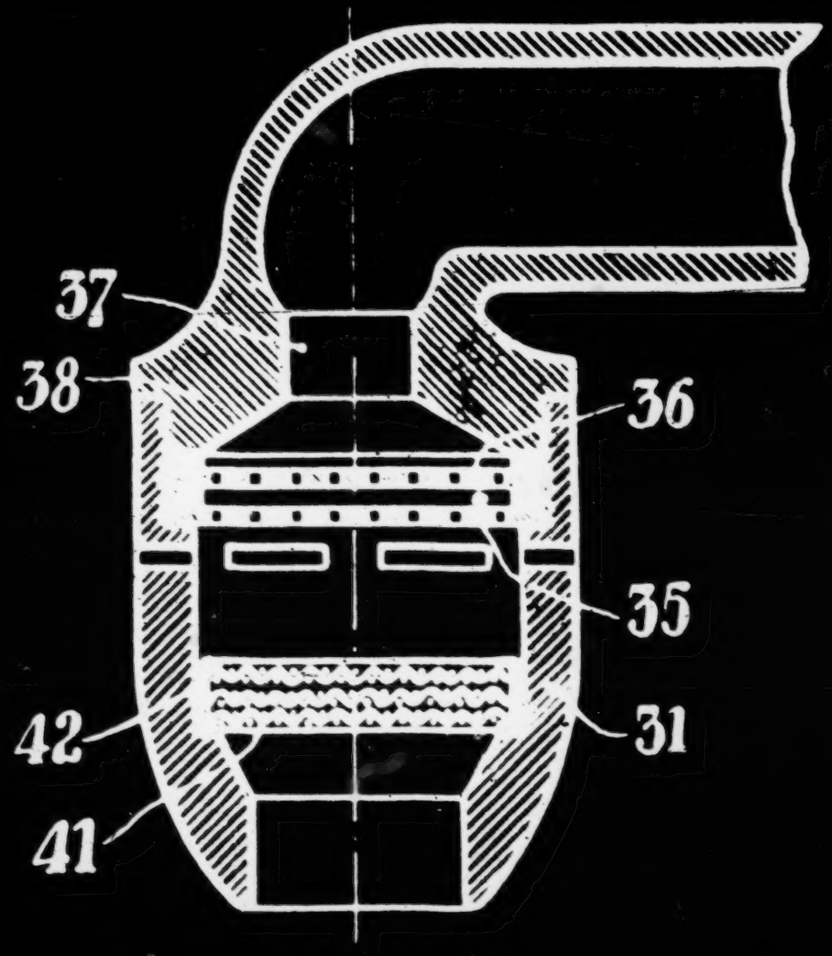


Fig.9



Witnesses :

Certified to be the drawings referred
to in the specification hereunto annexed.
Signed at MONTREAL, Can. Nov. 14, 1939.

Inventor
Elie AGHNIDES

By Marion & Marion
Attorneys

2 App. 376 Canadian File Wrapper

490112

PATENT AND COPYRIGHT OFFICE

COMMUNICATIONS SHOULD BE ADDRESSED
"THE COMMISSIONER OF PATENTS"
"OTTAWA"

WHEN PAYMENT OF FINAL FEE IS MADE THE APPLICATION SHOULD BE FULLY IDENTIFIED AND THE DATE OF ALLOWANCE MUST BE GIVEN.

CANADA

PATENT OFFICE

OTTAWA, December 2, 1952.

OTTAWA CANADA
PATENT OFFICE
7001

NOTICE OF ALLOWANCE

Serial No. 468,776

Inventor Elie Aghnides

Title Fluid Mixing Device

The above application for patent has been allowed.

The final fee, TWENTY-FIVE DOLLARS, must be paid not later than six months from the date of this notice.

The patent will issue in accordance with the provisions of Rule 90 of The Patent Rules, 1948.

Commissioner

To Messrs. Marion & Marion,
Box 368, Station "A",
Montreal, Que.

Circular No. 12
20M—7-52

Canadian File Wrapper 2 App. 377

MARION & MARION
(ESTABLISHED 1892)
PATENT ATTORNEYS

SOLLICITEURS DE BREVETS
D'INVENTION

RAYMOND A. ROBIC
J. ALFRED BASTIEN

CASIER No 368 STATION "H"
P. O. Box
MONTREAL 25, December 8, 1952

THE COMMISSIONER OF PATENTS,
O T T A W A,
Ont.

S I R,

Re: Elie Agnnides, Can. Pat. Appl. No. 466.776.

Attached herewith please find the sum of $25.00 (twenty-five dollars), covering the final fee for this application, which was allowed on December 2nd, 1952.

Yours truly,

Marion & Marion, Attorneys

per: E. A. Bastien

JAB/amg
Encl.

Canadian File Wrapper 2 App. 379

PATENT AND COPYRIGHT OFFICE

COMMUNICATIONS SHOULD BE ADDRESSED
"THE COMMISSIONER OF PATENTS"
"OTTAWA"

WHEN WRITING ON THIS SUBJECT REFER TO
SERIAL NUMBER OF APPLICATION

CANADA

PATENT OFFICE

OTTAWA, Dec. 11, 1952

Application Serial No. 468,776

Applicant Elie Aghnides

Gentlemen:

I have the honour to acknowledge the receipt of the final fee in the above application and to advise that the patent will issue under date Feb. 3, 1953.

Your obedient servant,

J. W. McIlwraith

To Messrs. Marion & Marion,
Box 368, Station "H",
Montreal, Quebec.

2 App. 380 Canadian File Wrapper

PATENT OFFICE

APPLICATION FOR PATENT

No. 468776 FILED Nov. 15, 1939

PATENT

No. 490112

DATE FEB3-1953

FEES RECEIVED

FILING FEE $ 15.00

ADDITIONAL CLAIMS $

REINSTATEMENT FEE $

RESTORATION FEE $

FINAL FEE $ 25.00

ASSIGNMENT FEES | ASSIGNMENTS RECORDED

(1) $

(2) $

(3) $

CARDBOARD DRAWINGS | CONVENTION PET'N OATH COPY

APPLICANT

Elie Aghnides

ATTORNEY

Marion & Marion
Box 368 Station
Montreal, Que.

INVENTION ~~Device for Intimately Mixing Air with Water Flowing under Pressure~~ Fluid Mixing Device

ACTION

Acknowledged by Circular I, and receipt mailed Nov. 22 1939

New oath called for - Lic 2 - Nov. 25/39, Lt. new oath & appt May 9/10/47. Lt. May 16/17/47. Ackd - dupl papers rtd case abandoned. May 30/47. Lt. June 16/17/47 Exn time to complete papers (E.O.) Aug. 26/47 LET DUPL & AWD'T. Sept. 5/6/47 Lt. Oct. 12/12/49 REP'T. & DUP'L. MLD. NOV 8 1950 Lt. dupl May 4/5/51. Telegram May 19/52 Acked May 19/52 REP'T. MLD. JUN 4 1952 Lt. Amdt. [illegible] Oct. 28/28/52 Lt. + 25.00 Dec 8/9/52 ACK'D. DEC 1 1 19[illegible]

DEC 2

PATENT

FEB3-1953

COST OF COPIES

PATENT	$	PETITION	$
SPECIFICATION		OATH	
DRAWING		CORRES., ETC.	
CLAIMS		RECORD FILE	1475

2 App. 385
490112

Canadian Patent

Fig.1

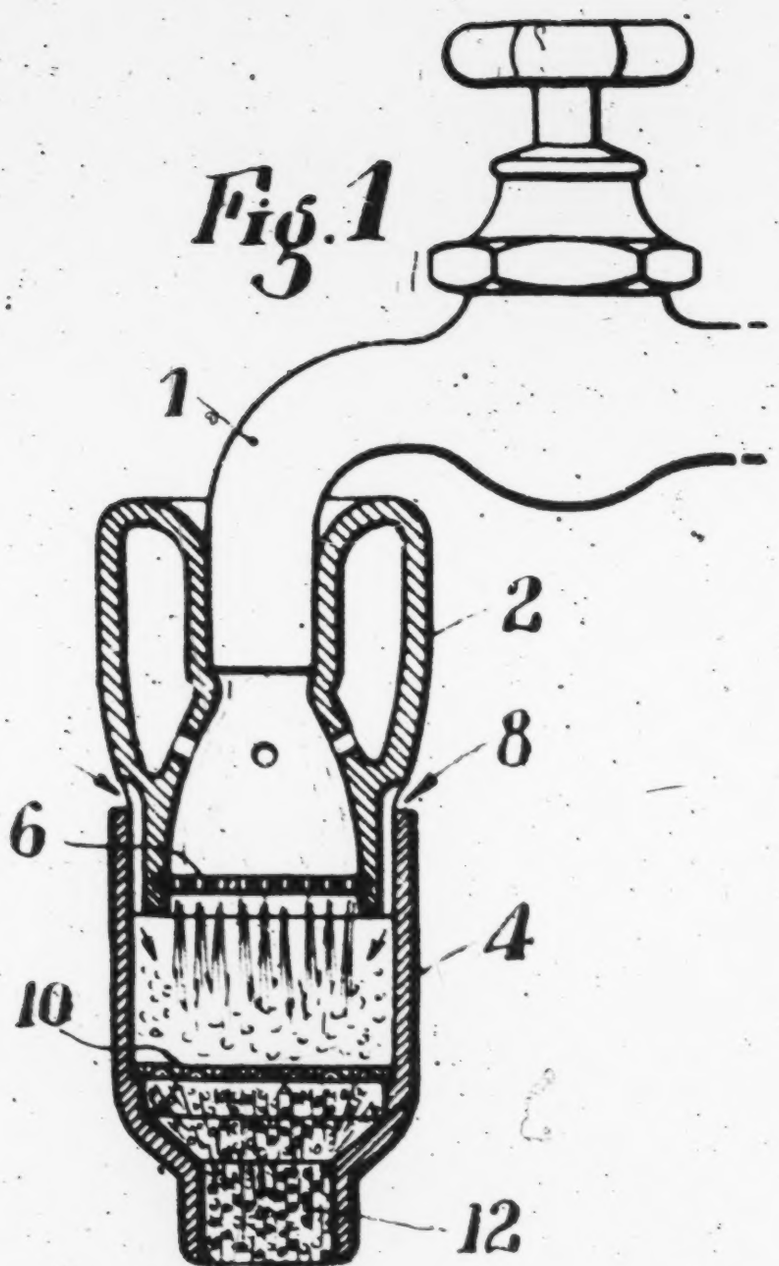


Fig.4

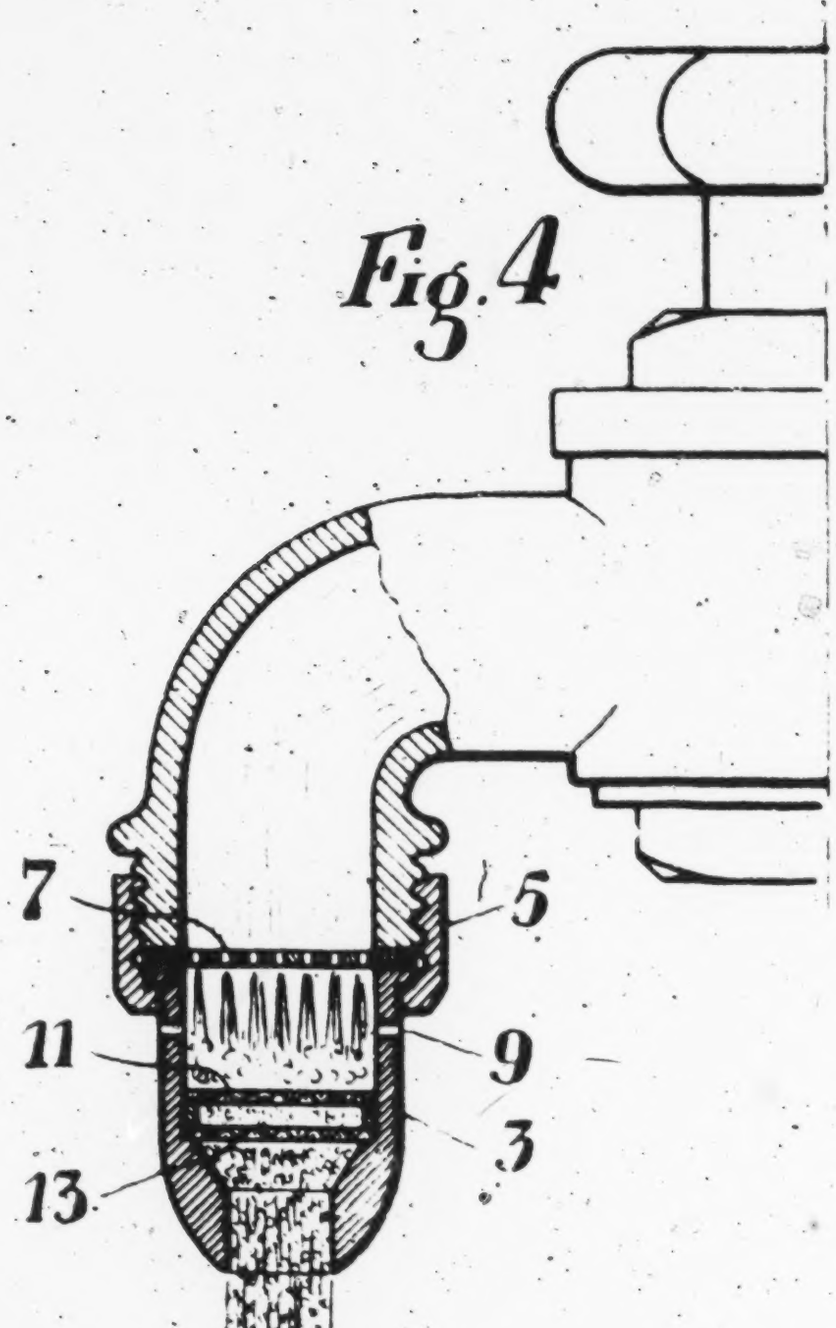


Fig.2

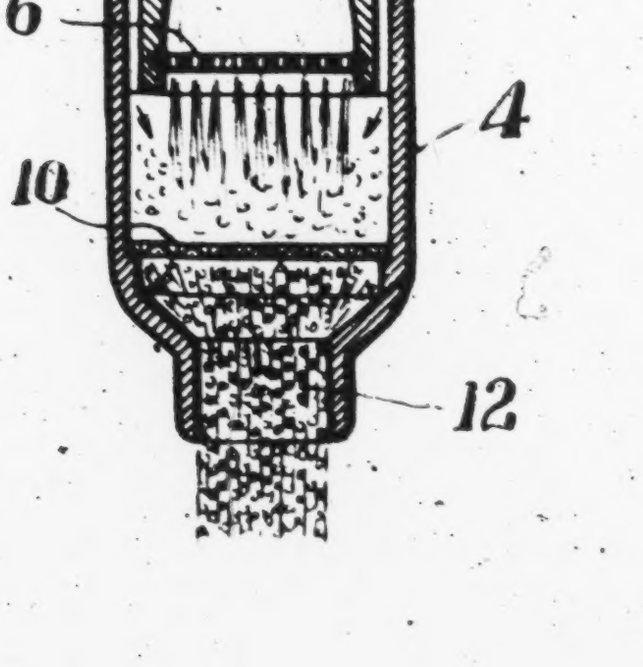


Fig.5

Fig.6

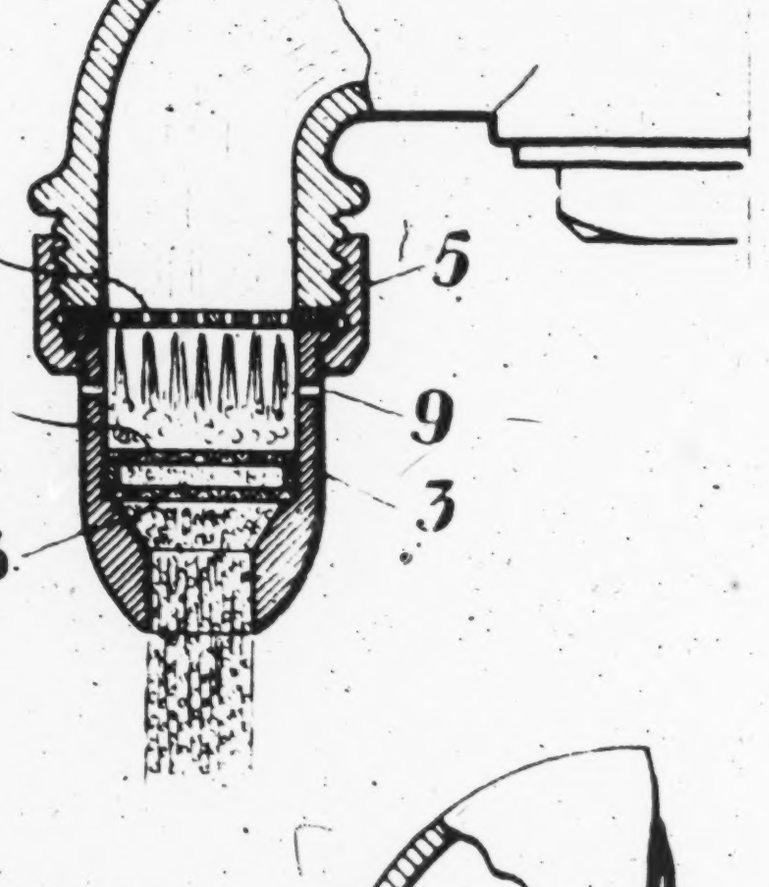
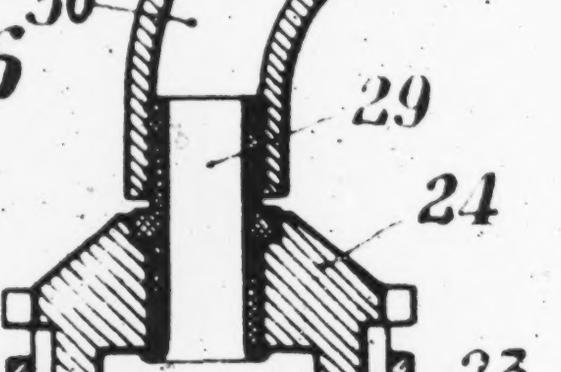


Fig.3

Fig.7



Inventor

Elie AGHNIDES

Ulmaxica

Dutch Patent 2 App. 387

Uitgegeven 15 Maart 1950.
Dagtekening 16 Februari 1950.

C. D. 615.838.5

Auteursrecht voorbehouden.

OCTROOIRAAD

NEDERLAND

OCTROOI No. 65293.

APR 4 1950

KLASSE 12 c 4 c (101 cs 4).

U. S. PATENT OFFICE ELIE AGHNIDES, te Brussel.

Straalstuk.

Aanvrage No. 93976 Ned., ingediend 22 Juni 1939, 14 uur 45 min; openbaar gemaakt 15 October 1949, voorrang van 22 Juni 1938 af voor conclusie 1, (Groot-Brittannië).

De uitvinding heeft betrekking op een straalstuk met een deel, dat een injecteur vormt en waardoorheen water kan stromen door een geperforeerd diaphragma, na welk diaphragma luchtaanzuigopeningen zijn aangebracht en met een uitlaatopening en een enkel- of meervoudig verdeel- en menglichaam tussen deze uitlaatopening en de luchtaanzuigopeningen.

Uit het Franse Octrooischrift 800.069 is een straalstuk van deze soort bekend, waarmede volgens deze publicatie lucht zeer fijn in de waterstraal wordt verdeeld, zodat een emulsie ontstaat en de straal niet schuimt.

Volgens de uitvinding zijn in het verdeel- en menglichaam doorstroomkanalen aanwezig voor het mengsel van water en lucht, die een middellijn van ongeveer 0,05 à 2,5 mm en een totale maximum lengte van ongeveer 30 maal deze middellijn hebben, alsmede een onderlinge afstand, die een onmiddellijke vereniging van de uit het verdeel- en menglichaam tredende afzonderlijke stralen en het insluiten van de meegesleurde lucht verzekert, en heeft voor een gegeven verdeel- en menglichaam de verhouding tussen de afstand van het diaphragma tot het verdeel- en menglichaam en de nuttige middellijn van het verdeel- en menglichaam een waarde, die kleiner is dan 1,4.

Bij deze uitvoering van het straalstuk zal de uittredende straal een grote hoeveelheid lucht bevatten in de vorm van bellen, die de schuimstraal sneeuwwit maken en ontwijken, zodra de straal in een vat wordt opgevangen. De straal kan 30 à 40 volumeprocenten lucht bevatten.

Het aan de bovenstaande eisen beantwoordende verdeellichaam kan op zeer uiteenlopende wijzen worden verkregen, hetgeen in het onderstaande aan de hand van de tekening zal worden toegelicht. In de tekening tonen:

fig. 1 en 2 axiale doorsneden van twee verschillende uitvoeringen van het straalstuk,

fig. 3 een dwarsdoorsnede volgens de lijn III—III in fig. 2,

fig. 4 een axiale doorsnede van een derde uitvoeringsvorm,

fig. 5 een axiale doorsnede van een verdeellichaam volgens een gewijzigde uitvoering,

fig. 6 een langsdoorsnede van een straalstuk, hetwelk geschikt is om aan een buigzame slang te worden bevestigd,

fig. 7 een dwarsdoorsnede volgens de lijn VII—VII in fig. 6, en

fig. 8 en 9 axiale doorsneden van twee andere uitvoeringen.

In fig. 1 is een normale huiskraan 1 weergegeven, die van een aansluitstuk 2 is voorzien, waarop het straalstuk 4 is bevestigd. Het water stroomt door de geperforeerde plaat 6 in het straalstuk 4 in de vorm van een groot aantal kleine stralen. Aan de omtrek van het aansluitstuk 2 bevindt zich een reeks kanalen 8, waardoor in het straalstuk 4 lucht van buiten kan toetreden onder de werking van de uit de openingen 6 komende waterstralen. In het benedendeel van het straalstuk 4 bevindt zich boven een vernauwde uitstroomopening 12 een zeefplaat 10. De mazen van deze zeefplaat 10 komen in doorsnede overeen met een cirkel, waarvan de middellijn tussen 0,05 en 2,5 mm is gelegen. De vernauwing 12 van de uitstroomopening bevordert het uitstromen in een regelmatige straal.

Bij de uitvoeringsvorm volgens fig. 2 en 3 is op de kraan 1 een metalen huls 14 geschroefd, die het geperforeerde diaphragma 16 tegen de uitstroomopening van de kraan vastklemt en die een verdeellichaam bevat, hetwelk bestaat uit drie op enige afstand of onmiddellijk boven elkander gelegen zeefplaten 18. Het dia-

Verkrijgbaar bij het Bureau voor de Industriële Eigendom, te 's-Gravenhage.
Prijs per ex. f 1.—.

phragma 16 heeft bij deze uitvoering slechts één centrale opening, en de huls 14 heeft hier eveneens een vernauwde uitstroommonding.

Bij de uitvoering volgens fig. 4 is de huls 3 voorzien van een aansluitstuk 5, met behulp waarvan zij op een gewone waterkraan kan worden bevestigd. Het geperforeerde diaphragma 7 is tussen de huls 3 en het benedeneinde van de kraan vastgeklemd en de lucht treedt toe door een reeks openingen 9. Het verdeellichaam bestaat hier uit twee boven elkander gelegen zeefplaten 11, 13.

De uitvoeringsvorm volgens fig. 5 heeft een geperforeerd diaphragma 16, waarvan de openingen zich aan de omtrek bevinden. De huls 17 is bij deze uitvoering voorzien van inwendige uitsteeksels 19. Het hoofddeel van de uit de openingen van het diaphragma tredende waterstralen stoot tegen de uitsteeksels 19 om te worden gebroken en is reeds met de door de openingen 21 aangezogen lucht gemengd, voordat het water het verdeellichaam bereikt. Dit verdeellichaam wordt hier gevormd door twee in het vernauwde deel 22 van de huls 17 gelegen zeefplaten.

Bij de uitvoeringsvorm volgens fig. 6 en 7 is het diaphragma 23, dat één enkele centrale opening, of openingen aan de omtrek of gelijkmatig verdeelde openingen kan hebben, aangebracht in een groef van een rubber aansluitstuk 24, waarvan het cylindrische buitenvlak voorzien is van langsgroeven 25 voor het toetreden van lucht. De huls 26 is op het aansluitstuk 24 geschoven en bevat drie op afstand gelegen zeefplaten 27 en heeft een vernauwde uitstroomopening 28. In het hart van het aansluitstuk 24 is een buisstuk 29 onwrikbaar bevestigd, waarop een buigzame slang 30 kan worden aangesloten, die met een bron voor water onder druk kan worden verbonden.

Bij de uitvoering volgens fig. 8 is het straalstuk 31 aan de rand 32 voorzien van zijdelingse openingen voor het toetreden van lucht. Dit straalstuk wordt geschroefd op een metalen aansluitstuk 33, hetwelk op zijn beurt op het einde van een kraan 34 is geschroefd. Het geperforeerde diaphragma 35 is tussen het aansluitstuk 33 en het straalstuk 32 vastgeklemd. Het verdeellichaam bestaat uit drie zeefplaten 39, die door ringen 40 van elkander zijn gescheiden. Bij deze uitvoering heeft het kanaal van het aansluitstuk 33 een vernauwing boven het diaphragma 35, welke ten doel heeft, de waterstraal in de as van het kanaal te concentreren ten einde na het passeren van het diaphragma 35 een grotere snelheid in het midden te verkrijgen, opdat de verdeling van de aangezogen lucht over de gehele doorsnede van de straal vóór het bereiken van het verdeellichaam 39 gelijkmatiger wordt.

De uitvoering volgens fig. 9 heeft eveneens een vernauwing 37 en onder deze vernauwing een extra geperforeerde plaat 36, die boven het diaphragma 35 is gelegen. De plaat 36 heeft ten doel, met behoud van de werking van de vernauwing 37 het water beter over het straalstuk 31 te verdelen. De extra plaat 36 kan ook worden toegepast bij de uitvoeringsvormen volgens fig. 1 en 4, bijvoorbeeld zonder aanwezigheid van de vernauwing 37. Bij de uitvoering volgens fig. 9 bestaat het verdeellichaam uit drie boven elkander gelegen zeefplaten 41, die in een ring 42 zijn gevat.

Conclusies.

1. Straalstuk met een deel, dat een injecteur vormt en waardoorheen water kan stromen door een geperforeerd diaphragma, na welk diaphragma luchtaanzuigopeningen zijn aangebracht en met een uitlaatopening en een enkel- of meervoudig verdeel- en menglichaam tussen deze uitlaatopening en de luchtaanzuigopeningen, met het kenmerk, dat in het verdeel- en menglichaam (10, 11 en 13, 18, 27, 39, 41) doorstroomkanalen aanwezig zijn voor het mengsel van water en lucht, die een middellijn van ongeveer 0,05 à 2,5 mm en een totale maximum lengte van ongeveer 30 maal deze middellijn hebben, alsmede een onderlinge afstand, die een onmiddellijke vereniging van de uit het verdeel- en menglichaam tredende afzonderlijke stralen en het insluiten van de meegesleurde lucht verzekert, en dat voor een gegeven verdeel- en menglichaam de verhouding tussen de afstand van het diaphragma (6, 7, 15, 16, 23, 35, 36) tot het verdeel- en menglichaam en de nuttige middellijn van het verdeel- en menglichaam een waarde heeft, die kleiner is dan 1,4.

2. Straalstuk volgens conclusie 1, met het kenmerk, dat stroomopwaarts van het diaphragma (23 of 35) een geperforeerd lichaam (36) en of een vernauwde doortochtsopening (29 of 37) is aangebracht.

Aanvrage No. 83076

Hierbij 1 blad tekeningen.

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Fig.1

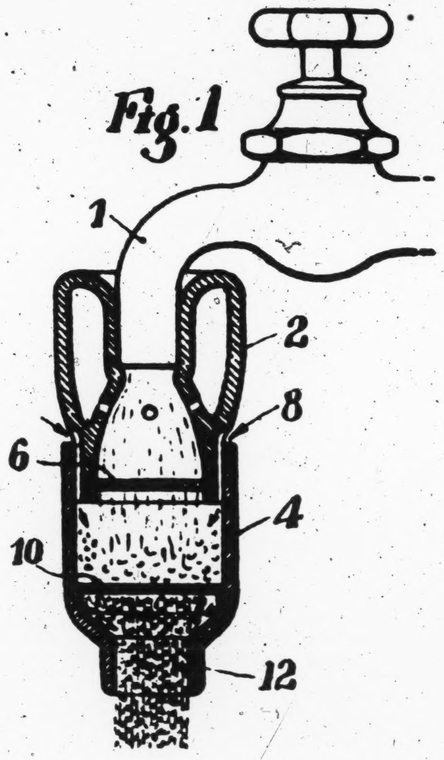


Fig.2

Fig.3

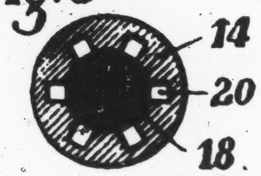


Fig.4

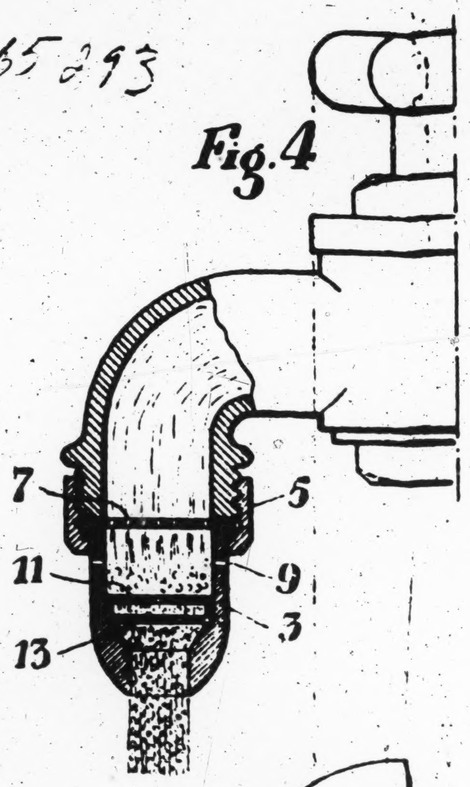


Fig.5

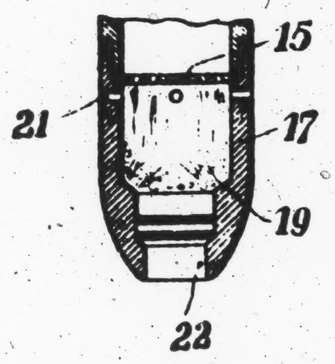


Fig.6

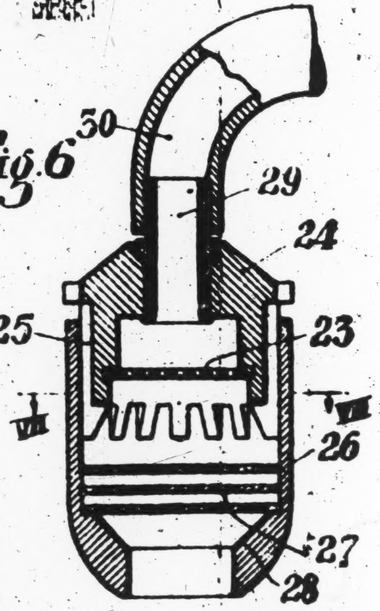


Fig.7

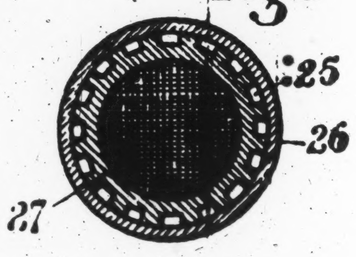


Fig.4

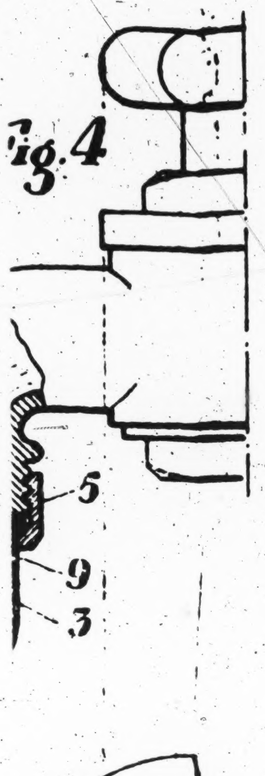


Fig.7

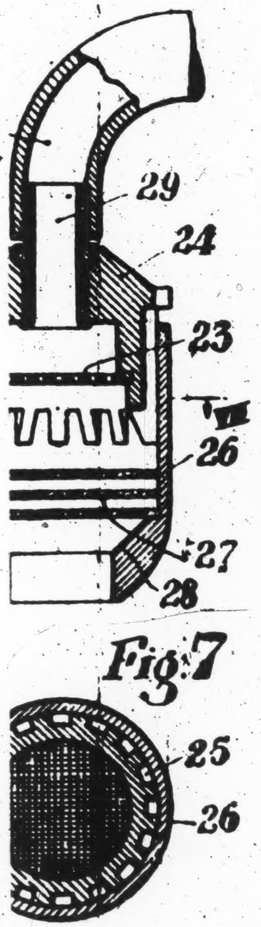


Fig.8

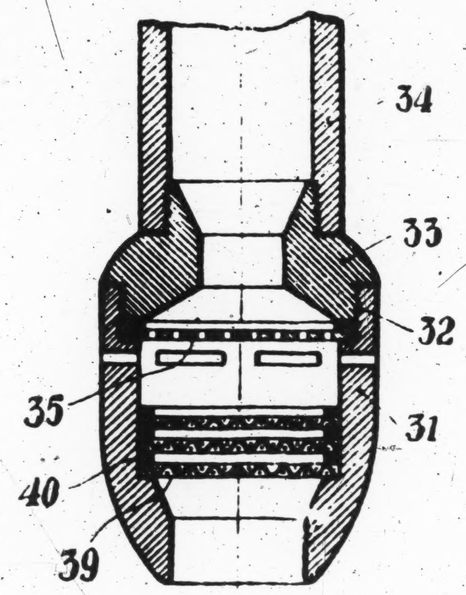
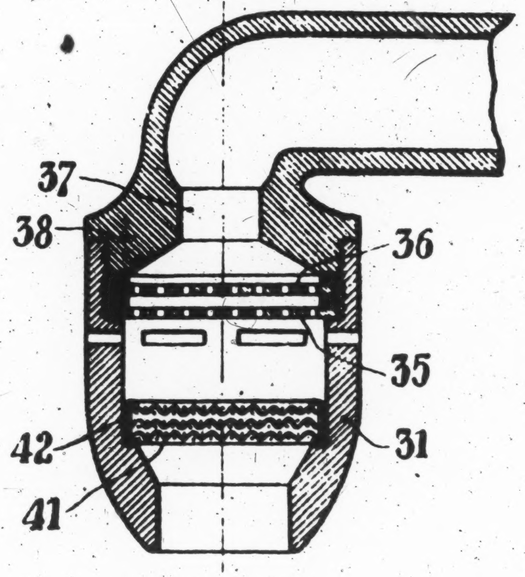


Fig.9



508

No. 508

FILED
SEP 27 1957
JOHN T. FEY, Clerk

IN THE

United States Court of Appeals

FOR THE FOURTH CIRCUIT

Docket No. 7,294

S. H. KRESS & COMPANY,

Defendant-Appellant,

vs.

ELIE P. AGHNIDES and CHASE BRASS & COPPER COMPANY, INC.,

Plaintiffs-Appellees.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF NORTH CAROLINA, GREENSBORO DIVISION.

APPENDIX TO PLAINTIFFS-APPELLEES' BRIEF

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FILED
JAN 8 1957
R. M. F. WILLIAMS, JR.
CLERK

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(Tr. 3:)

IN THE

District Court of the United States

FOR THE MIDDLE DISTRICT OF NORTH CAROLINA

GREENSBORO DIVISION

Civil Action #857

ELIE P. AGHNIDES, *et al.*,

Plaintiffs,

v.

S. H. KRESS & COMPANY,

Defendant.

Trial of the above-entitled action was begun in the District Court for the Middle District of North Carolina, at Greensboro, North Carolina, before HONORABLE JOHNSON J. HAYES, United States Judge, on Wednesday, January 26, 1955, at 9:30 a. m.

Present:

For the Plaintiffs:

MESSRS. BROOKS, MCLENDON, BRIM & HOLDERNESS, Greensboro, N. C., by Thornton Brooks, Esq.

MESSRS. ELY, FRYE & HAMILTON, 2505 First National Tower, Akron 8, Ohio, by Albert L. Ely, Esq., and E. R. Hamilton, Esq.

For the Defendant:

MESSRS. BLOCK, MEYLAND & LLOYD, Greensboro, N. C., by Norman Block, Esq.

MESSRS. BAIR, FREEMAN & MOLINARE, 135 South LaSalle Street, Chicago 3, Ill., by Will Freeman, Esq., and D. D. Allegretti, Esq.

* * *

(Tr. 12:)

Mr. Freeman: Under those conditions, we want to now make a motion before this Court that the second count of the complaint, which is directed to injunctive relief as distinguished from money damages, be dismissed.

(Tr. 13:)

The authorities are with us on that. There is no basis for this Court granting any injunctive relief to Mr. Aghnides because he has nothing that he can now protect.

* * *

Mr. Freeman: If they want to move to bring in Chase, that's another story, but nothing has been done.

* * *

(Tr. 16:)

Mr. Freeman: There is no question but what this suit may go on, in so far as damages, but we are talking about the injunctive relief.

The Court: It's no longer the policy of the federal courts to try any case by piecemeal, and we are interested, if we have to devote time to the trial of a case, to try it in a way to determine the rights of the parties. You just can't take them up piecemeal.

Mr. Block: That is our position, your Honor.

The Court: Subparagraph (a) of Rule 17 says:

> "Every action shall be prosecuted in the name of the real party in interest."

I am omitting the other part, not germaine to this.

Mr. Ely: I was going to say that although that assignment bears date December 3, 1953, it was not delivered and the actual delivery and consummation of the sale was not until December 8, 1954. So at the time the suit was filed Mr. Aghnides was in full possession of the patent.

The Court: I understand that. There's no doubt about his right to maintain it up to that point, but, so far as now appears, after he sold his patent, he has no future interest or right to it, if it's sold. I don't have the document (Tr. 17:)
before me, but, if that is the case, his successor in title alone is the one who would be interested with respect to any future infringement, and I can readily see why, in the event that the Court should find the patent is valid and the defendant is infringing, I can readily see why there would be no equitable ground for the granting of an injunction against the defendant in favor of this plaintiff, because at this time the plaintiff has no interest in the future conduct of the defendant. On the other hand, the successor in title is interested vitally in the future, and, if it isn't interested to the extent that it wants to enjoin the defendant, then it ought to have the action dismissed, or, rather, it should be dismissed, it would seem to me, as to Aghnides so far as injunctive relief is concerned, and narrow it down to the question of damages up to the present.

On the other hand, it appears to me preferable for the other party to come in and prosecute this action to a finality. In other words, if it is no longer interested in enjoining the defendant, if the present owner is not, the there's no use of our wasting time about the injunction, but, if it is interested, now is the best time for it to come in and show what its interest is. You might not be in a position to speak for the present owner—I don't know—

(Tr. 18:)
but for my part, looking at it solely from the standpoint of the Court's time, which is fully occupied, I don't want to waste time trying something that's not necessary, that's moot.

If you want time to confer and if you want to contact the present owner or its counsel to see if they want to come in here now and assert their rights under this assignment, I will be glad to entertain a motion to that effect, and, if necessary, continue the case, if it's going to take anybody by surprise. I have postponed everything else now with the expectation of trying this case this week.

Mr. Brooks: May I make the observation, may it please the Court, that even under the contention of Mr. Freeman this case can and has to go on at some time with regard to the matter of damages that Mr. Aghnides would be entitled to. That, in turn, involves the consideration of validity and non-infringement. So whether or not the equitable relief of an injunction to implement a decree is granted, it would still depend on the basic finding of validity of the patent and non-infringement.

The Court: But I don't think, Mr. Brooks, that the present owner should stand aloof from this litigation and then come in under this patent and harvest, if he can, what relief might be obtained in Aghnides' name now, unless it is willing to share in the burden. If it wants injunctive
(Tr. 19:)
relief it must come in here and assert it.

If you gentlemen want to confer and contact these people, I will give you time to do it; will postpone this trial until two o'clock if necessary. I want to know what you want to do.

Mr. Ely: I don't think it will take us until two o'clock. We will have to reach the patent attorneys for Chase Brass Company in New York. I think we can reach them in a very short time and get an answer.

The Court: Let me ask you gentlemen this: If that assignee authorizes this counsel here to enter the assignee as a party plaintiff—of course it doesn't dismiss the case as to Aghnides; he still has rights in this court—if they authorize counsel here to enter their appearance and to adopt the pleadings of the plaintiff and also to file the assignment, showing their title, and let the case proceed, would you gentlemen consent to go along with the trial or do you want time?

Mr. Freeman: We will consent to go along with the trial, provided Mr. Quay, who is General Counsel and Secretary and who carried on all the negotiations with Mr. Aghnides, presents himself to the Court for the purpose of my cross-examining that individual adversely, and if they will bring all of their records with respect to their (Tr. 20:)

sales of these devices which were made under the former license granted by Aghnides—in other words, I want to go ahead, your Honor—

The Court: Well, I won't impose all of those conditions.

Mr. Freeman: Then we need time, obviously.

The Court: If it comes in here, I will let it come in as assignee of this man, and the only thing that would be involved then is whether it is now the owner under the assignment of the patent Aghnides was prosecuting for the protection of. This case here in no wise involves any right on their part to recover for any infringement of Aghnides' patent while he was the owner, so I don't see why I should require them, as a condition, before they could come in, to bring their General Counsel here and also to file a report as to how many of these things were sold by them. As I understand, the present owner was a licensee of Aghnides before.

• • •

(Tr. 21:)

The Court: What do you want to do, Mr. Ely?

Mr. Ely: I'd like to call the Chase Brass attorneys in New York and ask them whether they want to enter their appearance here as a party.

The Court: You can also tell them that if they don't do it this Court intimates it will dismiss this plaintiff's plea for injunctive relief on the ground he has no interest in the patent at this time.

* * *

(Tr. 23:)

(By Mr. Ely:) In other words, I move now to amend the complaint by the addition of Chase Brass and Copper Company, Inc., of Waterbury, Connecticut, a Connecticut corporation, as party plaintiff, and it adopts the complaint

(Tr. 24:)

and the pleadings so far filed on behalf of Mr. Aghnides.

* * *

(Tr. 31:)

Mr. Freeman: I have no objection to the Chase people entering their appearance here and being bound by this Court's action, except that I want some time to prepare as against Chase.

* * * *

(Tr. 39:)

ELIE P. AGHNIDES, the plaintiff, being first duly sworn, testified as follows:

Direct Examination by Mr. Ely:

* * *

(Tr. 42:)

Q. (By Mr. Ely:) Mr. Aghnides, where were you when the invention of Patent No. 2,210,846 was made?

A. I was in Belgium; in other words, when I made that application, the corresponding application, I was in Belgium.

(Tr. 43:)

Then I applied for a patent in Belgium sometime early in December, I think, in 1934.

Belgium sometime early in December, I think, in 1934.

Q. Do you recognize a file history, which is Plaintiff's Exhibit No. 15, the file history of the abandoned application 52,923?

A. Yes, I do.

Q. Where was the original text of that application prepared?

A. In Belgium, by Belgian patent attorneys. They prepared the text, the specifications in there, in English and sent it down to Washington.

Q. Are you also familiar with the application for the first patent in suit, the file history of which is marked Plaintiff's Exhibit 16?

A. Yes, I am.

Q. What was the reason for preparing the second application, the second application which finally resulted in Patent No. 2,210,846?

A. When I paid my first visit to this country in 1937 one of the attorneys who went through this application of mine in the Patent Office—

• • •

(Tr. 44:)

Q. You mean the application which was then in the Patent Office?

A. Pending, the pending application. He thought that the English wasn't too clear and not too much in keeping with American practice and he thought it would be a good thing to rewrite that application.

Q. Was that the reason why the second application, the one you have in your hand, the application for the first patent in suit, the reason why that was rewritten and refiled?

A. That's right.

• • •

Q. (By Mr. Ely:) When did you next come back to this country?

A. In the fall of 1939.

Q. Why did you come back to this country in the fall of 1939?

A. Because my patent attorney in Washington advised me that we had difficulty with the Patent Office, we could not get the claims we thought we were entitled to and might have to have some litigation and go to the Board of Appeals in the Patent Office. I decided to go to Washington and give a demonstration in the Patent Office to show the difference from the prior art.

(Tr 45:)

Q. At that time the application was still in the hands of the Examiner, was it not?

A. Of course.

Q. Do you remember the patent on which your application had been rejected?

A. The Felten vacuum pump.

Q. Is that the British patent I show you, Felten British patent 6012 of 1909?

A. Yes, it is.

(Tr. 47:)

A. (By Mr. Aghnides:) The Patent Examiner, my patent attorney and myself went to the wash-room, and I connected each device on the faucet to give a demonstration. I have shown what each device does, what each device performs. You could see the Felten pump giving a meager stream with very little air in it, and then I

(Tr. 48:)
projected that stream from Felten into a soap solution and it gave a little amount of lather. Then I put my own aerator on the faucet and the Examiner could see the difference of the stream. If I am allowed, the stream business is something that you have really to touch and feel it; it's not something you can just sit and read over and say which is which. So the Examiner handled those streams, saw the effects of those streams on soap solutions, and withdrew the reference he had cited against my application.

• • •

Q. Did you take any part in the appeals proceedings?

A. I certainly did.

Q. What did you do?

A. I had the cited devices of Haisman and Friedrich built for demonstration purposes and also had my own aerators and I gave a demonstration to the three chief examiners of the device of Haisman, the device of Friedrich, and of my water aerators, particularly the one I just described, the Belgian-made aerator, and I also had with me an aerator made out of rubber with metal parts inside and I gave a demonstration with each.

(Tr. 56:)

Q. Do you have the rubber aerator which you demonstrated before the Board of Appeals?

A. Yes, here it is.

• • •

(Tr. 57:)

Q. (By Mr. Ely:) Did the three examiners go with you into the washroom?

A. Oh, yes, they went with me, and they came and touched the stream and appreciated the difference.

Mr. Freeman: We object to that.

The Court: Strike out that part of it.

The Witness: They came close to the demonstration and examined what I was showing to them.

Q. (By Mr. Ely:) Did they feel the stream, put their hands in it?

A. They did.

Q. This was in 1939, I believe, when this was done?

A. Yes, I suppose it was late in 1940; (Tr. 58:)
I wouldn't remember. The record shows the date.

* * *

Q. (By Mr. Ely:) Do you have a copy of Patent No. 2,210,846?

A. Yes, I have it here.

Q. I wish you would take that, please, Mr. Aghnides, and with special reference to Figure 4 and without going into any other figures right now, will you please describe the principles of construction and the principles on which that aerator works?

A. Figure 4 in the Patent 2,210,846, typical of my aerating principle, shows a casing, number 32. In the downstream end, inside that casing, there are two screens.

Q. Give the numbers, please.

A. They are numbers 40 and 42. Upstream of those two screens there are air ports or openings, 38, and upstream of those air ports or openings, 38, is diaphragm 36. This is the construction.

Q. Tell me about the diaphragm.

A. The diaphragm has a certain number of holes, it might be one or more. These orifices are small in order to oblige the water from the faucet to enter the chamber between the diaphragm and the screens I mentioned be- (Tr. 59:)
fore with great velocity, substantial velocity, so that in

that open chamber, the chamber open to the atmosphere through the orifices 38, the streamlets are naked, surrounded by free air, air circulating freely between those streamlets, so that when those streamlets find in their path resistance—in this case the resistance is presented by the screens 40 and 42—those streamlets break up and trap the surrounding air in the form of bubbles and then they discharge that from the lower end, the downstream end of the device, in the form of foam.

Q. What does the patent show about the screens, about the number of screens?

A. Well, the patent says that the highly efficient form of—you see on page 1, at the bottom of the column on the left, it says: "Also I find that a highly efficient form of dividing means is a fine screen located at the outlet, and I have found that even better results can be obtained if two or more superposed screens are used in the outlet discharge." Then it says: "The size of the mesh employed is not critical but I have obtained good results where the holes in the screen measured about .6 square millimeter."

Q. Now is there anything in the patent about any relationship between the resistance offered by the screens and the stream velocity?

(Tr. 60:)

A. There is indeed complete explanation of the relation between the orifices in the diaphragm or the velocity of the streamlets and the resistance to be placed below.

Q. Will you please point out where that is?

A. Yes, at the end of page 1, column 1, right, it says, last line: "While the total cross sectional area of the perforations in the screen 16"—meaning diaphragm 16—"under the usual conditions of operation, is such as to force the water into the chamber with substantial velocity and the screen 20"—meaning the wire mesh screen below

—"has the proper relative resistance thereto, to effect the desired result, it is obvious that any change in the cross sectional area of the perforations in the screen 16"—which is the diaphragm—"will require a change in the resistance of the screen"—

Q. That is the lower screen?

A. That is the lower screen. (Continuing) "—to establish the proportion necessary for the maintenance of substantially the same result. This water, again contacting with the screen 20, will pass through the screen with the air and emerge from the outlet 22."

Q. What type of stream do you get, what type of stream issues from the aerator? Please call attention to that.

A. Yes, I gave a description in my patent, page 2, left (Tr. 61:)
column, second paragraph, which explains about the functioning of this device.

• • •

(Tr. 62:)

Q. (By Mr. Ely:) Mr. Aghnides, just before the noon recess you were talking about the thoroughness of aeration. You were referring to that part of your patent on page 2, column 1, line 35. Did you complete what you wanted to say about the thoroughness of aeration?

A. Yes, aeration of the water is not effective unless every particle of water comes in touch with air. Now the aeration in industry is very well known. Hundreds of cities aerate the water; they spray it up in the air so that every particle will be aerated. So it is very important for my domestic aerator, so that the wife would have aerated water at the point of use, that the water is really aerated, because otherwise it's like mixing a glass of aerated water with five or six glasses of non-aerated water, and you can not say that the seven glasses of water formed by the mixture is aerated water. So it

is extremely important that the stream should be packed, aerated, with water, so that the air passes every particle (Tr. 63:)
of water. Even though the industrial aeration existed for decades, even though the water pumps were in the hands of scientists for decades, the water pumps were never used as aerators because they bring only a fraction of the water delivered in contact with air, and the result is not aerated water.

Q. You said something about the aerating at the point of use. Is that what your aerator does?

A. Yes, because in the case of industrial aerators, where the city aerates water, before delivery, that water, in spite of the aeration at the source, when that water traverses the canalization miles and miles before it reaches the housewife, it has lost already a great deal of the benefits of aeration and, as a result, water from the faucet is flat in taste, whereas my aerator for the first time gives a stream of water fully aerated at the point of use.

Q. I want to ask you this question: What character of stream do you get from your aerator?

A. I produce a stream which is coherent, packed with bubbles, so that all of the water comes in touch with air, a coherent, soft stream.

Q. Is there a reference to the coherent character of the stream in your patent?

A. Yes, sir, there is.
(Tr. 64:)

Q. Point it out, please.

A. I think it's on page 1, the left column.

Q. I can point it out for you: beginning about line 25, and then down further about line 45.

Q. What is the relation of the air inlet, air ports, with respect to the diaphragm, looking at Figure 4, for instance, and some of the others.

A. In the principle of my water aerator, the air inlets, for instance, in Figure 4 of the patent, as shown by numeral 38, open directly in the chamber directly downstream of the perforated diaphragm 36, so that the chamber will be at all times filled with air in which naked streams will be running through.

(Tr. 65:)

Q. Do the streamlets, or the jets, under high velocity, enter the chamber through the same ports as the air enters the chamber?

A. No. I have orifices in the diaphragm 36 for the delivery of water in the mixing chamber, and then I have independent orifices shown by numeral 38 for the entrance, admission, of air through those apertures into the mixing chamber. They are very separate and distinct orifices.

Q. Do you have a sample here that is made up in accordance with Figure 4?

A. I do.

(Tr. 67:)

The Witness: Now I proceed with the description of this device. Dowstream of the orifices which admit air during the operation we have two screens, as shown by numerals 40 and 42 of Figure 4 of my patent. Then downstream of those screens we have the outlet end through which emerges the coherent stream full of bubbles. This is, in substance, Figure 4.

(Tr. 68:)

Q. (By Mr. Ely:) Is that the Spring-Flo aerator made by Chase Brass?

A. Here I am holding the aerator made by Chase Brass and Copper Company under the trade name "Spring-Flo."

Q. Will you please take that apart and show his Honor

the internal construction and correlate it with Figure 4, match it up with Figure 4?

A. Yes, sir. These are the parts I am taking out of the main body or casing which, in Figure 4, are shown by 32. In the casing, the downstream end of the casing, as in Figure 4, there is a plurality of screens. Figure 4 shows two screens. The patent says two or more screens. I have three screens in the Spring-Flo aerator. Then in the downstream connection of those screens I have a perforated diaphragm. The perforated diaphragm has a skirt for creating the space between the diaphragm and the screens.

The Court: The skirt does the same thing as the wall was said there to do?

The Witness: Yes, the skirt has orifices for the admission of air and those orifices on the skirt are (Tr. 69:)

matching the orifices on the side of the casing so that the air enters through the slots on the casing and through the orifices on the skirt of the lower part of the diaphragm and reaches the mixing chamber, as the case is as shown in Figure 4 of the patent. Now the Spring-Flo aerator incorporates also my improvement patent. At the upstream end of this device I described and which forms a complete aerator, according to my first patent, at the upstream end I put a second diaphragm, which is the object of my second patent, and this is a complete Spring-Flo aerator as sold by Chase Brass and Copper Company.

The Court: This perforated diaphragm which takes the place of 34?

The Witness: Yes, on top.

Mr. Ely: No, not 34.

The Witness: 36.

The Court: 34 is what you call the skirt or shoulder?

The Witness: To support the diaphragm?

The Court: That spaces it up above these perforated screens?

The Witness: Yes, sir.

The Court: That particular device isn't described in Figure 4, is it?

(Tr. 70:)

The Witness: No, the skirt is not shown, but it is a shoulder to receive the disc in diaphragm 36. In the Chicago Faucet aerator we don't have that skirt and instead we have a shoulder so that the diaphragm could be placed on the shoulder, as shown in Figure 4. It has no functional importance.

The Court: Is there any functional difference between the device that is used here in the Chase aerator and that described in Figure 4?

The Witness: Not in principle; there is no difference in principle at all. In other words, if on this aerator or Spring-Flo that I am holding I put shoulders to space my diaphragm, the result would be exactly the same stream, and, as I said, the example is the Chicago Faucet aerator where, instead of a skirt, we have a shoulder for creating the space between the screens and the diaphragm.

Q. (By Mr. Ely:) Does that aerator bear both your patent numbers?

A. Yes, they do, the patent numbers, both of them.

Q. You were just talking about the Chicago Faucet. Let's have one of those.

Mr. Ely: This will be Plaintiff's Exhibit 30.

(The model aerator referred to was received in evidence as Plaintiff's Exhibit 30.)

(Tr. 71:)

The Court: That's a sample of what?

Mr. Ely: Chicago Faucet Company's Softflo aerator.

The Court: Is that one of the licensees of his?

Mr. Ely: Yes, sir.

The Witness: I am holding now the aerator made by the Chicago Faucet Company and sold under the name "Softflo." Now this aerator, Figure 4 of the patent and Softflo are exactly the same in this respect: that in the lower end we have the screens, as in Figure 4; then above the screens, upstreamwise, we have orifices for the admission of air in the space above the screens and as in Figure 4 where we have the orifices 38 just above the screens. Then above those orifices we have a shoulder to receive the diaphragm 36 of Figure 4, and as you may see, your Honor, there is no skirt; the diaphragm rests directly on those shoulders. So that skirt, in the Spring-Flo aerator, has no function except to keep apart the screens from the diaphragm, and in this construction that skirt does not exist. Then above the diaphragm we have a washer for spacing purposes and for sealing; and then I have a second diaphragm above the first diaphragm, and this second diaphragm is the object of my second patent. Above that I have a washer so that when this aerator is screwed onto the faucet water will not leak through.

(Tr. 72:)

Q. And that is also marked under both your patents, is it, both patents in suit?

A. It is, yes.

Q. Is there a commercial aerator made under your patent like Figure 1?

A. Yes.

Q. What is that, what name; whose is it?

A. This is an aerator made by Firestone Tire and Rubber Company under both my patents.

Q. What is the name of it?

A. The name of it is Velva-Flo aerator.

(Tr. 74:)

Q. (By Mr. Ely:) I wish you would look at Figure 6 and please explain to his Honor the construction of that form of your device, the one shown in Figure 6.

A. Figure 6—

Q. Incidentally, do you have an aerator that is made in accordance with Figure 6?

A. I do.

(Tr. 75:)

Mr. Ely: Let's have that. I am going to ask that this be received as Exhibit 32.

(The model aerator referred to was received in evidence as Plaintiff's Exhibit 32.)

Q. Will you first describe what the construction of Figure 6 is and then take that sample apart and show the Court just what you have?

A. Figure 6 of the patent shows, as in the other figures, the diaphragm. In Figure 6 the diaphragm bears the number 56. Then immediately below the diaphragm we have air vents, which are not marked by any number, so that air will be admitted in the chamber during the operation of the device. Then below we have shoulders adapted to receive the streamlets from the diaphragm 56.

Now I direct your attention, your Honor, to the holes in this diaphragm, which are oblique—they are not ver-

tical—so that the stream will be directed against the wall of the device, as shown in the drawing, so that the water, entering the mixing chamber with substantial velocity, surrounded by air, breaks up first against the walls of the device and then, after the first breaking up, goes through screen 62 and is discharged as a coherent stream having bubbles.

Now I am holding in my hand the sample of Figure 6 and I shall show the parts. At the upstream end we have a diaphragm with a series of holes. These holes (Tr. 76:)

are oblique, as the pin I am going to insert will show; it doesn't stay vertical. These holes are oblique so that the streamlets issuing in the mixing chamber would be directed against the wall or against the shoulder below and break up, as provided by this invention. Below this diaphragm we have, as before, the air vents, and below the air vents we have the shoulder and the screen, as I just described, so that the water issuing from the diaphragm will break against the plain surface, against the solid surface, and then further be broken up by the screen and discharged as a coherent stream.

Q. Then what elements constitute the resistance to the streams of the jets, the high-velocity jets?

A. The solid surface inside the mixing chamber is the first resistance that the streamlets issuing from the diaphragm find in their path, and then there is additional resistance offered by the screen below, number 62.

So the one breaks up and the other makes the water broken up into a coherent stream.

Q. Will you please rephrase that? I don't think it's quite clear.

A. Well, in this Figure 6, the streamlets issuing therefrom—

Q. I don't want to go back that far. It's just that last (Tr. 77:)
sentence.

A. The streamlets find in their path a solid surface and break up, and then they are further broken up by the screen below.

Q. You said something about issuing as a coherent jet.

A. Then the water issues as a coherent stream, having air bubbles disseminated throughout the jet.

Q. Do you have a sample in accordance with Figure 5?

A. Figure 5—no, I don't.

Q. Figure 7?

A. Figure 7—I do not.

Q. What about Figure 8?

A. Figure 8 is not an aerator.

Q. What is it?

A. For making soft drinks, mixing the liquids.

Q. Now you discussed here the Softflo, made by the Chicago Faucet, the Spring-Flo, made by the Chase Brass, and the Velva-Flo, made by Firestone. Now can you give us a figure as to what the commercial production by your licensees has been?

• • • •

(Tr. 79:)

The Witness: No, these figures are correct. For instance, Chase Brass sold 16,359,000 units and they paid royalties on those units; Chicago Faucet sold 876,678 units and paid royalties on all those units;
(Tr. 80:)
Firestone Company sold 4,499,532 units and they paid royalties until 1954, when they wrote a letter saying that—

Mr. Freeman: I object to what the letter said; it's not the best evidence.

• • •

(Tr. 81:)

Q. (By Mr. Ely:) Now, Mr. Aghnides, we have the sample of the Mel-O-Flo aerator—I think it's Exhibit 19—and we have a chart—

Mr. Ely: I am going to offer that chart which has just been put on the easel.

(The chart referred to was received in evidence as Plaintiff's Exhibit 33.)

The Court: What is that headed?

Mr. Ely: It is headed "Comparison of Melard Mel-O-Flo Aerator with Aghnides 2,210,846."

• • •

(Tr. 82:)

Q. (By Mr. Ely:) Made by Melard Manufacturing Company and sold by this defendant?

A. That's right.

Q. I want you first to say what the function and behavior of that aerator, in a general way, before you go into the details of it.

Mr. Freeman: That is, if he knows.

Mr. Ely: I think the gentleman knows. Go ahead.

A. This aerator, called Mel-O-Flo, that I am holding is attachable to faucets equipped with a thread and produces a stream of water loaded with air bubbles, a white stream of water which is full of air bubbles which aerate the water; and then the stream, like my stream is soft, has faster and better washing and rinsing quality, due to the air bubbles suspended in the stream, exactly what my aerator does. When the water is drawn through this

aerator the bubbles escape and you have aerated, more palatable water, as my own invention provides.

Q. How does the air get into the water in the bubbly stream that you have been talking about?

(Tr. 83:)

The Witness: At the upstream end of this device, the Mel-O-Flo, there is a diaphragm with small orifices through which the water from the faucet goes, is delivered, and below the diaphragm there is a casing with lateral holes for the admission of air, and below those lateral orifices for the admission of air there is a resistance formed by the screen, so that the performance of this aerator is the delivery of naked streams in an open chamber to receive free atmospheric air and then to strike the inner walls of the casing and then further break up at the screen at the discharge end of the device and emerge as a coherent, bubbly stream.

Q. (By Mr. Ely:) Suppose we come down to the chart, Plaintiff's Exhibit 33, and, if you will take the pointer and

(Tr. 84:)

take the article along with you too, will you please show to the Court first the various elements—

The Court: Wait just a minute before he gets on to that. You have not described this diaphragm.

The Witness: Yes. This diaphragm here is formed by a ring and the plate that is seated in that ring. The plate is provided with teeth so that when the plate is seated in that ring the space between the teeth and the ring forms openings through which the water goes with high velocity.

The Court: But the piece itself is not perforated like the screen (diaphragm?) in yours?

The Witness: No.

The Court: It has openings around the border of the piece through which the water can escape downward?

The Witness: When the parts are hooked together, then we have perforations formed by the division of two parts.

The Court: What do you call this piece that is seated in that ring?

The Witness: I'd call it a plate.

The Court: It appears to have something fastened to the bottom of it so as to give it a flat effect of some kind. What is that?

The Witness: That is the resistance when the water comes out at the lower end of the ring, slides (Tr. 85:)
over the onion-shaped body, and is deflected against the walls of the casing. So this arrangement is, as in my Figure 6, to deflect the streamlets delivered by this combination forming the diaphragm to the lateral walls of the casing in the way my Figure 6 does, so that the streamlets emerge from the lower end of the ring and, because of the curvature of the onion-shaped body, as the drawing will show in this enlarged form, they are deflected and they strike the lateral walls of the main casing. So they break up there against the walls of the casing and then they are further mixed by the screen below.

(Tr. 86:)

Q. (By Mr. Ely:) Is there any resistance in the paths of the streams of water as they issue from the disc 36'—first tell me is there resistance in the paths of the streams of water as they issue from the openings 36'.

A. Yes.

Q. What constitutes the resistance?

A. We have the onion-shaped body over which the water has to slide and strike the inner walls of the casing. So that is one resistance, the onion-shaped body. And then, further, we have the walls of the casing shown by numeral 40. So the water strikes up against the wall 40 and then falls on the screen 42, which further breaks and mixes the air with water, and then the result is a foamy stream, coherent and bubbly.

Q. Where are the air ports? First, what is the chamber marked on this chart?

A. The Chamber is marked "C".

Q. Where are the air ports?

A. The air ports are in the upstream direction—the air ports are below the diaphragm delivering the water in forceful streamlets.

(Tr. 87:)

Q. And those air ports are marked 38?

A. They are 38; that's right.

Q. You said something about the claim. Take over here on this chart and compare the two, Figure 4 and the Melard aerator, as illustrated on that chart.

A. Claim 1 of Patent 2,210,846 reads as follows:

> "A device for producing a coherent jet of water containing air bubbles, comprising a chamber (C)"—

Q. Point that out.

A. Here we find a chamber C on the Melard aerator and we find a chamber C on my aerator.

Q. Figure 4?

A. Figure 4. "the inlet end (34)"— We have the inlet end 34 in both cases—"of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end (32) of which is adapted to discharge the said coherent jet"—

Q. Is that in both?

A. In both we have the outlet end 32—"a diaphragm (36)"—here we have a diaphragm 36 in both cases—"at the upstream end of the chamber"—in both cases it is at the upstream end of the chamber—"having at least one orifice"—both have a plurality of orifices—"through which the stream of water is adapted to be forced into the cham-
(Tr. 88:)
ber with substantial velocity"—in both cases the stream of water from diaphragm 36 is adapted to be forced with substantial velocity into chamber C—"an air port (38) opening into the chamber through which air is induced by the stream of water"—now we have air port 38 in both cases—"and means (40, 42) in the path of the stream"—here we have the means 40 and 42 in Melard, as we have the means 40 and 42 in my aerator—"in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end"—in both cases after it leaves diaphragm 36 and before it is discharged through the outlet end 32—"for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet."

Q. Now Claim 4, "The device of claim 1 in which the said means comprises a screen (42)", we don't have to go all through the claim, but just point out the screen.

A. Yes. Claim 4 of my patent says "The device of claim 1 in which the said means comprises a screen (42)"—which we have in both cases—"at the discharge end of the chamber C"—C and C—"the openings in which are sufficiently close together so that the streams of aerated water issuing therefrom immediately join each other to form a
(Tr. 89:)
single jet." And both screens are of that type.

Q. Now will you compare the operation of this device with Figure 6 of the patent, show the Judge any correspondence you find between the Mel-O-Flo aerator and Figure 6 of the patent?

A. In Figure 6 of my patent we have diaphragm 56 which has orifices so inclined, as one can see, as to direct the streamlets against the wall of the casing downstream of that diaphragm 56. In the Melard aerator we have below the openings in the diaphragm an onion-shaped body adapted to deflect the water in the same direction as my disc does, in other words, against the wall of the casing which is down below, so that in both cases the water breaks against the walls or the shoulder therein before reaching the screen which is below at the outlet end of the device, which we also find in both constructions, in the Melard aerator and in my Figure 6. So we both have a diaphragm adapted to divert the stream of water into the chamber at high velocity, break against the wall of the casing, and in both cases we have the same condition after that breakage, which is the provision of a screen below for further breaking up the water and producing a coherent stream.

* * *

(Tr. 90:)

Q. (By Mr. Ely:) Now let's take a look at your second patent, Mr. Aghnides, 2,316,832. Have you got that?

A. Yes.

Q. What was the purpose of the second patent; what was accomplished by the second patent?

A. Well, the purpose of my second patent is clearly described on page 1, column on the right, third paragraph.

Q. Would you mind calling his Honor's attention to it?

A. Which reads as follows: "'I have found that when the water is discharged through a restricted orifice, as at 17, Fig. 1, at 22, Fig. 2, and at 32, Fig. 3''—it is marked by

mistake in the patent Figure 6, but there are only three figures, so I shall read "at 32, Fig. 3"—"that the flow (Tr. 91:)
through the orifices in the upstream diaphragm is improved and a more regular and softer jet is delivered from the outlet end of the device." So that is the purpose of my second patent.

Q. Will you point out to his Honor the construction in Figures 1 and 2?

A. In Figure 1 of the Patent 2,316,832 I have shown by numeral 17 the restricted orifice which is the embodiment of this patent and which restricted orifice is immediately upstream from diaphragm 18.

Q. Which of your commercial devices has that in it?

A. The Firestone aerator, Velva-Flo, is built exactly according to Figure 1.

Q. Now you say the restricted orifice was one of the means, as I understand it, of smoothing out or making more regular and softer the jet; the restricted orifice was one of the means. Another means, you said, was the second upstream diaphragm?

A. Yes. I found I could produce that softening or evening up of the stream by the use of either the restricted orifice, as shown in Figure 1 by 17, or by using a second perforated diaphragm upstream of the first one, as shown in Figure 2 of said patent by numeral 23.

Q. Figure 2 also shows—what is the element 21?
(Tr. 92:)

A. 21 is the coupling, with a restricted orifice 22, so that the combination of the restricted orifice and of the second disc are shown together in Figure 2, in the cross section Figure 2.

Q. Let's take the Mel-O-Flo aerator, if you will, please. Do you find in the Mel-O-Flo aerator the two diaphragms?

A. I do.

Mr. Ely: Now, if your Honor please, I am going to introduce a chart, Exhibit 35.

(The chart referred to was received in evidence as Plaintiff's Exhibit 35.)

Q. Now will you point out, please, where you find, if you do, the two diaphragms in the device illustrated in this chart which has been marked Exhibit 35?

A. If we look at the left we see in the Mel-O-Flo aerator where numeral 23′ are the orifices in the first diaphragm. Then downstream of these orifices we have a second opening, which is shown by numeral 24, exactly what I have shown in Figure 2 of my patent 2,316,832. I have the main diaphragm below, shown by 24, and upstream of diaphragm 24 I have the second diaphragm 23. So in both cases the water traverses first a diaphragm having a restricted orifice 23 in both cases and then traverses the second diaphragm shown by numeral 24 in both cases and enters the mixing chamber and strikes the walls, means for breaking up the water. (Tr. 93:)

Q. I believe you have a chart in which you have colored those two diaphragms in the Melard aerator.

Mr. Ely: I am going to ask that that be received as Exhibit 36.

(The chart referred to was received in evidence as Plaintiff's Exhibit 36.)

Q. Now will you explain to the Court what you intend to show by that?

A. In this copy here we have shown in black (purple) the two diaphragms in the Melard aerator. We have diaphragm with opening 23′, which is the second upstream

diaphragm, and which is shown in my device by 23, and below the opening 23', the first diaphragm, we have the disc 24 with the space in between as in my own construction where also there is a second diaphragm below the first one and the two restricted orifices of the diaphragms are somewhat spaced from each other.

Q. Will you please take that claim 4 of that patent and show how it is readable on the Melard aerator?

A. Yes. We have here on this chart, Exhibit 35, claim 4 of my patent 2,316,832, with cross sections of the Melard aerator and my aerator, Figure 2 of said patent. The claim reads: "A device for producing a jet of water containing air bubbles comprising a chamber (C)"—and we find that chamber C in both constructions—"the inlet end (Tr. 94:)
of which is adapted for connection with the discharge end of a faucet or the like"—and we find both connected with the faucet—"and the outlet end of which is adapted to discharge said jet"—we have in both cases the discharge end at the down stream end—"superposed apertured diaphragms (23, 24)"—we find those superposed apertured diaphragms 23 and 24 in both cases—"at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity"—that is what happens in both cases—"an air port (25)"—here we have an air port 25; there we have an air port 25—"opening into the chamber"—in both cases they open into the chamber—"through which air is induced by the water delivered from the apertured diaphragms and means (26, 27, 28)"—here we find the means 26, a part of the onion; then we find the wall 27, and the third resistance, which is the screen 28; and here in my aerator, Figure 2, we find resistances 26, 27 and 28 formed by the three screens shown at the downstream end of the device.

Q. Now, if you will go back, let's look at that Mel-O-Flo aerator again, please, sir. Put it together with the adaptor. As I understand, you said there was a restricted orifice in this second patent that also performed the function of smoothing out, or taking out irregularities, or softening (Tr. 95:)
the stream?

A. Yes, sir.

Q. Is there a restricted orifice in that Melard aerator?

A. Yes, like the Figure 2—

Q. Tell the Court what it is.

A. Here I am holding the Melard aerator, which has at its upstream end a very restricted orifice through which water from the faucet enters and reaches the diaphragms below.

Mr. Ely: We have a chart here which I am going to offer in evidence as Plaintiff's Exhibit 37.

(The chart referred to was received in evidence as Plaintiff's Exhibit 37.)

Q. Going to the chart, will you point out on the chart the elements?

A. Yes. Here on this chart we have again vertical cross sections of the Melard aerator at left end of my areator, Figure 2 of patent 2,316,832. We see in both cases the restricted orifice 22. Then downstream of that restricted orifice 22 we see in both cases superposed aperture diaphragms.

Q. They are the same as in connection with the other claim, are they not?

A. Yes. Then we have the resistance means in the discharge end. Now if we read this claim 2 of my patent we see that the Melard has all the elements in the function

(Tr. 96:)

described in this claim 2. Claim 2 of Aghnides 2,316,832 reads as follows: "A device for producing a jet of water containing air bubbles comprising a chamber (C)"—we have a chamber C in both cases—"the inlet end of which is adapted for connection with the discharge end of a faucet or the like"—and we see both connected to a faucet—"and the outlet end of which is adapted to discharge said jet, an apertured diaphragm (23)"—here we see 23 in both cases—"at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity, an air port (25)"—here we have an air port 25 in both cases—"opening into the chamber through which air is induced by the water delivered from the apertured diaphragm and means (26, 27, 28)"—here we have means 26, 27 and 28 in both cases—"in the path of the water after it leaves the apertured diaphragm and before it discharges at the outlet end for finely breaking up the water and mixing it with air to form a coherent jet having bubbles and a restricted orifice (22) upstream the apertured diaphragm."

Q. Now, Mr. Aghnides, are you ready to demonstrate the several aerators we have been talking about here?

A. Yes.

(Brief recess taken.)

(Tr. 97:)

Q. (By Mr. Ely:) Now we are at the demonstration tank in the courtroom. I am going to ask Mr. Aghnides first to describe this tank, and I am going to mark the tank as the next exhibit, 38.

• • •

(Tr. 98:)

Q. (By Mr. Ely:) Now I wish you would start the tank going, and the first thing I want you to demonstrate is the Spring-Flo aerator, Exhibit 29. What pressure are you going to work this—

The Court: That is the Chicago device?

Mr. Ely: No, sir, that is the Chase Brass.

A. These demonstrations are made under thirty pounds pressure, about the average water pressure in the homes. Frankly, nobody knows the exact pressure. That is the pressure we used before and it is adequate to operate each device fully and supply all the pressure and water necessary for functioning of each device. So, for point of comparison, we might show on the gauge each time a pressure of thirty when the water is flowing through the device.

Q. All right, start it up.

A. Now we have the Spring-Flo in operation and one can see a snow-white stream saturated with air bubbles, a condition necessary to effect a true aeration of the water. When we place an object in the white stream we see the object enveloped by the stream without any splashing and

(Tr. 99:)

with millions of bubbles covering the object.

Q. What is the object?

A. The object I am using here is a jar, half a gallon big, just to provide a surface.

Now I would like to show how this water flows into a glass when drawing a glass of water. We shall see the thoroughness of aeration when we think the glass is full (demonstrating).

Q. Shut it down and tell us what you did.

A. When the stream was flowing I place a glass under the stream until the glass was full and then pulled away the glass to show all the bubbles escaping and to show also that only a portion of the glass is filled with water, the rest being air, showing the extreme thoroughness of aeration.

The Court: All right, do that again.

The Witness: (Demonstrating with glass.) When the glass is being filled one can see that every particle of the water comes in touch with the air and almost half of the glass is empty, due to the bubbles escaping.

Q. (By Mr. Ely:) Now the next one I want you to do—

The Court: Before you leave that, what do you claim is the advantage of doing that?

The Witness: I claim, and it is accepted in science, that when the water comes into close contact with (Tr. 100:)

air, first of all, a part of the oxygen of the air is dissolved into the water; second, when those bubbles are escaping they carry away a great deal of odors due to chlorine and other gases; so it is more palatable because, first, the taste is improved by removal or decrease of the bad odors, and, second, by addition of the dissolved oxygen. These are the reasons for which industry aerates water at the source before delivering to the cities, but then that water, after being aerated at the source, goes through the pipes and loses a great deal of its benefit, but this aerator has the added ability, which was never seen before, to provide a stream of water with bubbles, and when you are using the stream during

its flow either for washing your hands or washing dishes or glasses or projecting that bubbly stream into a soap solution, you get a tremendous amount of lather. If you are rinsing your hands or dishes you rinse much faster because every cubic inch of this water has swelled into several inches of foam; in other words, this device increases the volume of the product delivered through it, which is water plus air. We know that when we have a glass of beer and the foam falls down the whole thing disappears; in other words, when you swell a parcel of water with bubbles you create a much bigger volume and that volume, when running over objects, as the white (Tr. 101:)

stream does when you are washing, washes with less water in less time; and if it's flowing through soap solution those bubbles, with the soap, produce a tremendous amount of lather, because lather is nothing but air and water plus soap. Until now the housewife had to agitate by hand to create some lather from soap, but here the millions of bubbles of equal size do create through soap solution the creamiest lather ever seen. So the stream itself has features never seen before, never used before.

Q. (By Mr. Ely:) What about the feel of the stream?

A. The feel of the stream is splashless and most pleasant, which seems to please the public, and, due to the tremendous amount of air—if your Honor will put your hand in the stream—these bubbles cushion the impact and make the stream softer. There are two series of advantages, one due to the bubbly stream, the other due to the aeration of the water; and, as the bubbles have escaped, by that time you have a bubble-free, better tasting, more palatable water.

Q. The next thing I have on my list is to demonstrate the Mel-O-Flo aerator without the adaptor. When you take the adapter off, when you take that rubber top known as the adaptor off, then you can screw the aerator directly on the faucet?

A. This is Exhibit 19. Here we have the defendant's (Tr. 102:)
aerator adapted for the faucet and operating under the same conditions and giving also a stream in every respect the same as my stream; in other words, it is a white stream loaded with air bubbles, soft to the touch, and, naturally, aerated water, water which is better for drinking purposes.

The Court: Let some of that run in your glass just like you did the other; demonstrate that.

The Witness: (Demonstrating) Here also about the same result or degree of aeration.

Q. (By Mr. Ely:) Now you have some others, and I'd like you to go through the same demonstration.

A. When we place an object—and I am using the same jar, half-gallon size—we see the object covered with a non-splashing, quiet, foamy stream, covering the object with bubbles all over.

The Court: Right here, while I am thinking about it, take off the attachment and run some water through and let's see how it is where you don't have either attachment.

(Witness demonstrates, placing jar in stream produced by faucet without attachment.)

The Court: Now catch some water in the glass the same way.

(Witness demonstrates, filling glass from stream produced by faucet without attachment.)

(Tr. 103:)

Mr. Ely: I want him to make a comment on that.

The Witness: We saw, when I placed the jar—

The Court: Taking both fixtures or attachments off and letting it run without attachment?

The Witness: Yes, sir, I removed the aerator from the faucet and let the ordinary water, without any attachment, fill the glass, and we saw that the glass was practically full when I removed it from the faucet. As the stream did not contain any air bubbles, the glass was filled with water and there was no room for the glass to get instantly half empty by escape of bubbles, which did not exist in this case.

Then I placed in the ordinary stream without any attachment the half-gallon jar and we saw the stream splashing and without any bubbles covering or enveloping the jar, in distinct difference with what I had demonstrated before.

Q. (By Mr. Ely:) The next thing I have here is model of Figure 4 of the first patent in suit, Exhibit 28.

(The witness demonstrates with jar and glass, the faucet being equipped with Exhibit 28.)

Q. Now tell us what you did and what happened.

A. I repeated the experiment by putting under the aerator according to Figure 4 of the patent a glass and I filled it and, as in the previous case, the glass was half empty when I pulled it away from the stream, due to the amount of bubbles in that stream. Then I placed under

(Tr. 104:)

that stream of that aerator, Figure 4 of the patent, the half gallon jar, to show that the bubbles here again were covering the surface of the jar.

Q. Now the next thing I have is to demonstrate the model of Figure 6. That is Exhibit 32.

(The witness demonstrates with glass and jar, the faucet being equipped with Exhibit 32.)

Q. What do you have to say to that?

A. I have demonstrated now Figure 6 of my patent, built exactly as the drawing shows, and I put the glass under the stream and I obtained a much less aeration than before. Then I placed the jar in the stream and I obtained bubbles covering the jar about as before; it's hard to say.

Q. Now let's see the Velva-Flo. That is Exhibit 31.

The Court: Whose make was that?

Mr. Ely: Velva-Flo was Firestone's.

(The witness demonstrates with jar and glass, the faucet being equipped with Exhibit 31.)

The Witness: Now I demonstrated the rubber attachment embodying Figure 1 of my patent, made by Firestone Tire and Rubber Company—

Mr. Freeman: May we have the patent number? There are two patents here involved and my cross examination is going to segregate those two patents. (Tr. 105:)

Mr. Ely: The first patent.

The Witness: Embodying two patents, though, embodying the second patent.

The Court: He said that top piece put in the Velva-Flo embodied the principle in his second patent.

Q. (By Mr. Ely:) You said this was Figure 1 of your first patent?

A. Yes, sir.

Mr. Freeman: But it isn't, though.

The Court: It showed, when he pulled it apart, that in the top of it it embodied his second patent also.

The Witness: As before, I placed in the stream a glass which, when pulled away, emptied itself almost halfway, showing the degree of aeration. Then when I placed in the stream the half-gallon jar we again saw the bubbly stream splashlessly covering the surface of the jar.

Q. You spoke a couple of times when you were on the stand about the naked streams, that is, that you had the streams going down to the chamber completely surrounded by air. Do you have a way of showing that to his Honor?

A. I do.

Q. What are you going to do?

A. I am going to use an aerator where I cut off the wall (Tr. 106:)
above the screens so that one can see the naked streams striking the screens below without any flooding from the side orifices.

Mr. Ely: I want to introduce this as Exhibit 39.

(The model referred to was received in evidence as Plaintiff's Exhibit 39.)

Q. Will you show his Honor just what Exhibit 39 is?

A. I have taken a rubber connector, and I placed in it the diaphragm from the Velva-Flo aerator made by Firestone.

The Court: Is there any screening in the upper part of this exhibit here; is that open, just a restricted orifice there?

The Witness: It is a restricted orifice above the main diaphragm. So the two patents are embodied in the rubber connector.

The Court: Is there any screen in the rubber part of it?

The Witness: No screen. There is a disc, as I shall open and show it to you. There is a diaphragm, as provided in my patent, attached at the lower end of the connecting part to the faucet, and below that diaphragm I have the screens used in the Velva-Flo. Above those screens there is not any wall, to show that this chamber is not flooded, so when I shall place this aerator on the faucet, of course, we will see (Tr. 107:)

that the water goes through, breaks up by these screens, and discharges as a coherent stream without flooding the chamber between the diaphragm and the screens.

Q. (By Mr. Ely:) Put it together and then put it on the faucet. Now what are you doing? You are putting Exhibit No. 39—

A. I am putting Exhibit 39 on the faucet and operating under the same pressure, thirty pounds.

(Witness demonstrates with glass and jar.)

Q. Now tell us on the record what you did, Mr. Aghnides.

A. I demonstrated an aerator where the space between the resistance and the diaphragm upstream of said resistance was completely open to the atmosphere and showing that the mixing chamber is not flooded; that those streams strike the resistance below, those streamlets having high velocity strike the resistance below while surrounded by free air, not in a flooded chamber. This is the

fundamental difference, because so much free air around is mixed in abundance with the streams that break up and tap the air that goes through the device, producing the result we have seen; and the result was, as before, the glass was half empty when we thought it was filled, and the stream flowed over the half-gallon jar with the same smoothness and enveloping way.

(Tr. 108:)

Mr. Ely: At this point, your Honor, we have a drawing of the device which was just demonstrated, and I am going to ask that that be marked Plaintiff's Exhibit No. 40.

(The drawing referred to was received in evidence as Plaintiff's Exhibit 40.)

Q. Now you have another model, don't you, to show these naked streams?

A. Yes, I do.

Mr. Ely: This device we have here I am going to mark as the next exhibit, Plaintiff's Exhibit 41.

(The model referred to was received in evidence as Plaintiff's Exhibit 41.)

Q. What is that, Mr. Aghnides?

A. This is an aerator built according to Figure 4 of my first patent. It was built of transparent material except for the diaphragm and the screens and the coupling to put onto the faucet. It has a plurality of screens downstream the diaphragm and then, in the space between the diaphragm and the screens, there are orifices for the admission of air, just like Figure 4 that I described before.

Q. Figure 4 of your first patent?

A. Figure 4 of my first patent.

Q. How many diaphragms downstream do you have?

A. Just one diaphragm downstream.

(Tr. 109:)

Q. Any restricted orifice upstream?

A. No.

Q. Turn it on. Are you putting the flashlight on it?

A. The flashlight is directed on Figure 4 of the first patent to show that the streamlets delivered by the diaphragm in the chamber of the device are naked streams surrounded by air.

Q. Do you want to go through your same demonstrations?

A. Also I would add that one can see that the chamber is not flooded because, otherwise, the water would come out of the lateral orifices.

(Witness demonstrates with glass and jar.)

The Court: Why did that splash out more than the other?

The Witness: If I increased the resistance inside, as the patent teaches, it would be a better proportioning, but this device is built roughly to demonstrate the naked streams inside. We could put one more screen to demonstrate that, as the patent says, it functions better with two or more screens.

Q. (By Mr. Ely:) Have you got another screen to put in there?

Mr. Freeman: We might, for the purposes of the record, state how many screens were in there with the demonstration just made.

(Tr. 110:)

The Court: What have you got in there?

The Witness: Two.

The Court: What are you doing now?

The Witness: Now I am adding one more screen so that I shall have in this device three screens instead of two. I am spacing these screens by means of a ring, and now I shall put it on the faucet to show that the stream will become softer.

The Court: Is it correct to say that you have added one ring and one more screen?

The Witness: Yes.

(Witness demonstrates.)

You see, you have a much evener stream by the addition of the screen. The screen creates the resistance proportioned with the upstream diaphragm. I shall demonstrate the results of this stream.

(Witness demonstrates.)

The Court: What do you observe to be the difference?

The Witness: The difference is that this stream flows more evenly because the resistance offered by the screens and the diaphragm has been better proportioned.

Mr. Ely: Wait a minute. You didn't mean that —the resistance offered by the screens and the diaphragm?

(Tr. 411:)

The Witness: And the velocity of the streamlets emerging from the diaphragm have been better proportioned. As I had demonstrated before, it was according to Figure 4 of the first patent, but, as the patent teaches that two or more screens give even a smoother stream, I added one more screen and I demonstrated again and I obtained a glass of water which emptied a great part of its volume instantly, and also we have seen it flows smoothly, without

any splash, over the half-gallon jar I put in the stream.

Q. (By Mr. Ely:) Now his Honor asked a question while you were on the stand why the water didn't come out of the air ports and you said something about the proportioning that made it so that the water went through and didn't come up through the openings, the air ports. Do you have a device here to illustrate that to his Honor—and tell us what it is?

A. Yes, indeed. Here I am holding the Firestone aerator in which I have added three screens; in other words, it has its normal screen resistance plus the three screens I added to increase resistance in the path of the water emerging from the diaphragm upstream of the screens.

Q. How many screens has that got in it now?

A. Now this aerator has six screens.

Mr. Ely: I am going to offer that as Plaintiff's (Tr. 112:)
Exhibit 42.

(The model referred to was received in evidence as Plaintiff's Exhibit 42.)

The Witness: I will show the Court that if in this construction of my aerator principle you put too much resistance the chamber will be flooded and the water will squirt out of the orifices provided on the sides for the admission of air.

(Witness demonstrates operation of Exhibit 42 on faucet.)

Q. (By Mr. Ely:) Can you tell what is happening?

A. One can see that the chamber where the screens are is flooded, because the water is squirting out of the lateral

orifices and the stream contains no bubbles whatsoever. There is no aeration taking place because the device is not proportioned according to my patent.

Q. That is to say, in this case, when you had Exhibit 42 with the additional screens, there was no aeration of the water?

A. That is what I said.

Q. And the water was coming out of the air ports?

A. That is what I said. If we take those screens off, just to show that this aerator is a normal Firestone aerator—

Q. What are you doing now; taking those additional (Tr. 113:)
screens out?

A. Yes, I am taking those additional screens out, so that it is now as made by Firestone.

(Witness demonstrates operation of Exhibit 42 on faucet, with three screens removed.)

The Witness: We have a stream, as we saw before, full of bubbles, and no water squirts out of the lateral air vents.

Mr. Freeman: Mr. Ely, with the consent of the Court, I wonder if we could put in one more screen and show how it works with four, and with five, and possibly with two and with one. We could possibly save a lot of cross examination.

The Court: I don't object to it.

Q. (By Mr. Ely:) He wants you to take them one at a time. How many have you got in now?

A. I have one screen added to the standard Firestone aerator, and there is still good aeration (referring to operation of exhibit on faucet).

Mr. Freeman: Four screens in all?

The Witness: Yes.

The Court: That's two in the escape part, is it not, in this bottom part?

The Witness: Three; and one more makes four, a total of four.

Mr. Freeman: Could we have the same demonstration with the glass and the jar?

(Tr. 114:)

The Witness: We did not have it with the jar and glass before.

The Court: Go ahead and demonstrate with the glass and the jar.

The Witness: (After demonstrating.) Now I demonstrated the Firestone aerator with one additional screen, which makes a total of four screens. The result is still a smooth stream but less air in the stream, because we see the glass is not emptied as much as when we tried before the standard Firestone aerator.

Q. (By Mr. Ely:) "Is not emptied as much"—I wonder if that is going to be understandable. You mean the amount of space occupied by the air is less—I don't know just how to put that—there is more water and less air?

A. Yes, more water remaining in the glass.

Q. Put in two screens.

A. Now the aerator has five screens.

(Witness demonstrates with Exhibit 42 on faucet.)

Q. What happened?

A. We have now an aerator with two added screens, so it makes a total of five screens, and we see that there is even more water remaining in the glass; in other words, the degree of aeration has decreased.

(Tr. 115:)

The Court: What effect did it have on the air vents?

The Witness: The air vents were still in operation, so the stream still had bubbles. We were approaching a critical point, but the device still gave a stream having bubbles, but, as the glass test showed, the stream had much fewer bubbles than before.

Q. (By Mr. Ely:) Was water coming out of there?

A. Water was not coming out.

Q. You didn't see it; it was on our side. Put it on again.

A. (Demonstrating again.) I said it was approaching the critical point. Some water started squirting out of the lateral vents, but there was still some aeration.

Now when we add a third screen to the Firestone aerator, making a total of six screens; the chamber inside the aerator is completely flooded and the water squirts out of the air vents and the stream of water has no bubbles whatsoever (demonstrating again).

Mr. Freeman: Could we put that on properly? It isn't moved up to the proper position. Is that because the screens won't let it go up?

The Witness: Yes.

Mr. Ely: I think that is all the direct.

* * *

(Tr. 134:)

Q. (By Mr. Freeman:) Do you have a copy of the Felten patent which you referred to yesterday in your direct examination?

Mr. Ely: It is an exhibit, isn't it?

Mr. Brooks: It is Exhibit 24.

• • •

(Tr. 135:)

Q. (By Mr. Freeman:) How is the air and ozone brought into the apparatus wherein it is mixed?

A. What do you mean by "how"?

(Tr. 136:)

Q. Well, what are the physics by which the ozone and air are brought into contact with the water?

A. In this device?

Q. Yes; I am speaking only of Felten.

A. Well, this device is a lateral pipe, as is shown in Figure 1. That lateral pipe is connected with a container where ozone is produced, and then the ozone produced and the air in that container are sucked in in that injector, and the suction created, as Felten describes, by the widening of the Chamber E, which is responsible for creating the vacuum and effecting the suction.

Q. In other words, there is a jet of water that flows into the chamber E; correct?

A. Yes, but that chamber E is flooded, so the jet—

Q. I didn't ask you that—

The Court: Let him answer. He said, "Yes, but."

The Witness: In other words, you said the jet flows into chamber E, and I said no, because the chamber E being flooded, the jet is no more a jet. The jet is as wide as the orifice, as the black portion of chamber E shows, so you don't have a jet entering chamber E and striking the disc F, because that chamber is flooded.

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(Tr. 152:)

Q. (By Mr. Freeman:) How about Figure 8?

A. Figure 8 is not an aerator.

Q. What is Figure 8?

A. Figure 8 is for mixing three liquids for making soft drinks.

Q. Do you find anything in the specification of your patent that Figure 8, aside from taking in two different

(Tr. 153:)

things through the openings in the side, operates any differently than Figures 1, 2, or 7, by way of example?

A. Yes, I do.

Q. Where do you find that?

A. Well, when I read the description of Figure 8 I see that there is no reference made to bubbles, there is no reference made to water, to air, and Figure 8 shows those two lateral pipes, which indicate that the air orifices—I mean the orifices on the side—are for connection to some container. So the picture shows that there are two connecting means for connecting the device with two different sources of liquid, plus the connecting means on the top. Then the description of Figure 8 does not make reference to air, whereas the description of every other figure in this patent says air and water and bubbles. Moreover, if you wish to open the patent application, you will find that was for three liquids.

Q. Open what?

A. That abandoned specification, Figure 8, you will find that was for three liquids.

Q. I find the only description for Figure 8 starting on line 11, page 2, column 2, of your patent and continuing on down to line 46. Is that correct?

A. Yes.

(Tr. 154:)

Q. And it is your position that because there is no ref-

erence to air bubbles it is some different type structure?

A. Oh, definitely.

• • •

(Tr. 158:)

Q. (By Mr. Freeman:) You now disclaim any of the claims as readable upon what is shown as Figure 8?

A. I definitely do.

Q. Now I am going to ask you to look at Figure 8 and tell me whether or not you there find a diaphragm having at least one aperture in it?

A. Yes.

Q. And that aperture is given what reference numeral?

A. In other words, I would say the equivalent. I find one orifice, but I don't find a diaphragm; find one or more

(Tr. 159:)

orifices.

Q. Is it your position that because the member is rather solid as distinguished from a thin plate it is no longer a diaphragm?

A. No; I said the equivalent.

Q. It is the equivalent?

A. Yes.

Q. Do you find directly below the aperture—

A. Which aperture are you referring to?

Q. Well, it can have four apertures or a single aperture. I am just taking one aperture, or you can take all four.

A. There are numerals; we might refer to the numerals to make it clear.

Q. The openings that I referred to are the apertures 74, which you can see in Figure 9, which is a sectional view taken on line 9 of Figure 8.

A. Yes, you are referring to opening 74. All right.

Q. There you have in vertical position, as the drawing shows, openings that are directly below the screw-threaded

portion at the upper end which is adapted to be fastened to some tap or other device; correct?

A. Yes.

Q. And through those openings, under the pressure of the fluid from above, there is discharged a plurality of jets of liquid, water, under high pressure or velocity? (Tr. 160:)

A. Yes.

Q. And those jets of water draw in air through the inlet ports 76 and 77; correct?

A. When they are left open, yes.

Q. Well, even in the Chase device, if you close up the air ports no air gets in?

A. No; but the difference is these are to be connected to a closed container.

Q. That has some air in it?

A. So, to make the statement correct, if it's operated as it is intended, it will not be. So I make the point that if you want to operate it differently by leaving them open, then, I said, yes, there will be air.

Q. Now, so that we understand each other, if you connect the ports 76 and 77 to two containers, then as the water passes through the apertures 74 it will draw whatever air is in those containers downwardly along with the water; correct?

A. Yes.

Q. And if the two ports are open to atmosphere, as distinguished from the containers, it will suck in air from atmosphere?

A. Right.

(Tr. 161:)

Q. The air and water will then pass downward and initially strike against baffles 78; correct?

A. "Strike" is not correct, because they shall find in their path the baffles 78; in other words, the initial velocity

of the stream of water going through the orifice 74 has been lost because this chamber 74, the conical chamber, is already flooded. So it has decreased velocity, the chamber is under pressure to create a piston effect, and then the water goes into the chamber where the screens are.

Q. Isn't it a fact that your patent specification states, quoting—and I am reading from page 2, column 2, line 35: "Baffles 78 project into the passages at the point where the passages discharge into the mixing chamber. The baffles in part interrupt the course of the fluids in each passage and thereby serve to effect a preliminary mixing of the fluids." Is that correct?

A. Yes, naturally, because the baffles interrupt the flow so that the chamber would be flooded, and whatever amount of air has been there, naturally it is in contact with the liquid.

The Court: As I understand the witness, he means that the chamber then was filled up with water instead of having air in it. Is that what you say?

The Witness: There is a little air there with the (Tr. 162:)
amount of water filling that conical chamber, and then they discharge in the chamber below where the screens are.

Q. (By Mr. Freeman:) Now that you have gotten the conical chamber 74 full of water, then you wouldn't suck any more air in because there wouldn't be any space for air?

A. I didn't say that. The obstruction 78, whatever I call it in my patent, the baffle 78, is not closing that conical chamber entirely; it is only interrupting partially the flow, so that the flow is continuing and there will be a little air continually going through the device with the water when this device is operating with open pipes.

Q. Well, can we agree that whatever water and air is within the conical opening 74, that that will be interrupted at least to some degree by the baffles 78?

A. The baffles slow down the flow so that that chamber will be flooded, to effect a higher vacuum.

* * *

(Tr. 186:)

Q. (By Mr. Freeman:) And the difference between the vacuum-producing pump, as shown in Figure 8, is the fact that there is less space when the water passes through the aperture diaphragm and before it enters into the mixing chamber; is that correct?

A. It is not a question of less space; it is a question of being flooded. Otherwise you wouldn't produce a vacuum, because if you had free air around the water, freely circulating, that air would as easily go back in the chamber being evacuated as it would have a tendency to go downstream. Therefore, in order to be able to create the vacuum, so that the chamber being evacuated gets devoid of air, you create in that device called a vacuum pump, (Tr. 187:)

whether it's Felton or my own pump, you have to create a solid portion, which I call a piston effect—call it whatever you like—you have to flood that chamber and create enough pressure to prevent the back-flow of air from the throat into the chamber which is being evacuated, because the chamber that is being evacuated has a terriffic suction toward the outside, or to pull the air back. You know when an electric bulb breaks it makes a lot of noise, because the air rushes in. In other words, the atmospheric pressure wants to go and occupy the space that is emptying, unless there are means provided to stop the return of free air into that chamber; otherwise it is impossible to create a vacuum.

Q. Are you telling us, then, structurewise, that you have to have different proportions?

A. You have to have, structurewise and in mode of operation, different principles in order to make either an aerator or a pump; and when you do have different structure and different mode of operation, then you have different results too, as probably later could be demonstrated and proven.

Q. In Figure 8 of your patent, the patent in suit, you say that is a pump?

A. That is a pump; that is a vacuum-producing device.

Q. And the rest of the devices, the various six or seven different devices, they are what you call aerators?

(Tr. 188:)

A. Exactly.

• • •

(Tr. 196:)

Q. (By Mr. Freeman:) I hand you a copy of Aghnides Patent No. 1,912,113 and I will ask you if that is the water pump that you referred to?

A. Yes, that is one.

• • •

(Tr. 199:)

The Court: That pear-shaped, or onion-shaped, device designated by figure 8, what function does it perform in the pump; what does it do?

The Witness: It prevents the air to go back in the chamber which is being evacuated, because it precisely floods the portion immediately above that onion and prevents the back-flow of air into the

(Tr. 200:)

chamber which is being evacuated by creating a tight, piston effect in that channel and directly above the onion.

The Court: Then, if it were not for the pear-shaped device there, the air would go back into the chamber that was being evacuated?

The Witness: Yes. It wouldn't be a good vacuum pump, wouldn't be effective.

• • •

(Tr. 214:)

The Court: Now, then, demonstrate the difference between the defendant's aerator, Plaintiff's Exhibit No. 19, and your pump, shown on Defendant's Exhibit 15.

The Witness: As the drawing will show, probably will, but we could show here on the sample of defendant's aerator, the water emerges from the space above the onion and below the ring and hits the wall below the lateral orifice on the casing, and that space where the water, from the diaphragm of the defendant strikes the wall is in direct communication with the air ports, and we do not see any water squirting out of those air ports, proving that the chamber where the onion is is not flooded. In other words, the streamlets from the defendant's device strike the wall as naked streamlets, they break against the wall, and that wall is in direct communication with the foregoing lateral air ports.

(Brief recess taken.)

(Tr. 215:)

Q. (By Mr. Freeman:) You said that the air openings in the Aghnides patent, Defendant's Exhibit 15, did not open into the chamber in which the onion was positioned?

A. Yes, there are no air openings, neither above the largest part of the onion nor below the largest part of the onion.

Q. Air does get into the chamber in which the onion is positioned; correct?

The Court: He explained how some came down through those canals up there, through that opening in member 5; he has gone into that part of it.

The Witness: Yes, through the same orifice, some air with water.

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(Tr. 248:)

The Witness: The velocity of the water permits the water to break up; the velocity is the cause effecting the breaking up of the water against the wall so that the water is fragmented as it strikes the wall of the chamber and is broken up into particles, like splashing water in a wave, it is broken up and air in the device surrounding the water—

The Court: How does the air get there?

The Witness: The air gets there through the air vents or air ports 38. You had seen, your Honor, yesterday—

The Court: I am just asking you to tell me how that happens.

The Witness: The air is constantly entering through the air ports 38 the chamber, so the chamber is at all times filled with air surrounding the water flowing into that chamber.

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(Tr. 280:)

Q. (By Mr. Freeman:) The coherency of the water is brought about by the screen?

A. By any means uniting them completely. In this case, if they were not completely united, the screen completes the uniting.

The Court: If the screen were entirely removed here, what would be the result? I mean 28.

Mr. Freeman: That's right; that's what we are talking about, the defendant's structure.

The Witness: Then the stream would not be as coherent as it would be with the screen 28, and it would not be as soft as it would be with the screen 28.

The Court: What about the volume of air in it with the number 28 removed, as compared to the case if 28 remained in it, if you have an opinion about it?

The Witness: The volume of air?

The Court: Yes.

The Witness: If the screen 28 is removed, maybe even more than with the screen on, but that air would readily separate from the stream as the stream is discharged from the device.

(Tr. 281:)

Q. (By Mr. Freenman:) In other words, the screen tends to eliminate or permit some dissipation of the air as the water and air discharges through the lower end of the casing?

A. The screen decreases a little the air drawn through the device, but, in compensation, keeps the air drawn in, whatever the amount, in the stream, it makes it coherent, so that the bubbles in the air-and-water mixtures thoroughly mix, they remain in the stream. The question is not to deliver a stream from which the air separates immediately and the stream itself then does not contain the maximum amount of bubbles. Therefore, by putting the screen 28, whatever the degree of coherence of the mixed air and water by the means 26 and 27, the screen, as I said completes the required resistance in the uniting of

air and water, of the aerated water, into a coherent stream, so that in the issuing streamlet bubbles will stay better in the stream than otherwise.

The Court: Better with the screen in than it would if you would take it out?

The Witness: Yes.

Mr. Freeman: I wonder if I could get that answer read?

The Court: Read the answer.

(The answer to the last question was read by the reporter.)

(Tr. 282:)

Q. (By Mr. Freeman:) In other words, the screen now has some resistance and completes, as you said, the required resistance?

A. It has some resistance, definitely.

Q. Is there any reference to resistance in the second means clause of your claim?

A. You can not make any uniting without any mechanical means, and any mechanical means in the path of the water is resistance; so it had not to be put in the means portion of my claim number 2 that the uniting of the aerated water offers resistance, because it is elementary that any mechanical means in the path of the water offers resistance.

(Tr. 308:)

Q. It is kept from moving inwardly, is it not, by this column of water which is cone-shaped?

A. I am sorry, the column of water is way under where it starts, and we have orifices, airports, in other words, opening into that chamber far away from the red line which indicates the skirt of water. So it just invades the whole space.

Q. And isn't it a fact that the air, when it is sucked in, it is because of a vacuum that is produced as the air is (Tr. 309:)
discharged through the lower end of the device?

A. The air is sucked in because the water broken up imprisons, captures, the air present.

Q. What brings the air from outdoors in through the airport?

A. The velocity of the stream, the velocity of the stream breaking in the chamber where the air is present.

The Court: He asked you what brings the air in.

The Witness: The velocity of a stream breaking in an open space.

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(Tr. 315:)

Mr. Brooks: Your Honor, at this time the plaintiffs tender to the defendant a motion on behalf of the plaintiff, Elie P. Aghnides, to add as a new party plaintiff Chase Brass & Copper Company, Inc., and an accompanying complaint on behalf of Chase Brass & Copper Company, Inc., together with a proposed order, dated January 26, 1955, adding Chase Brass & Copper Company, Inc., as a party plaintiff.

I understand there is no objection on the part of the defendant to the entry of this order and the receipt of these documents.

Mr. Freeman: None whatsoever.

(Tr. 343:)

The trial of the above-entitled matter, having been adjourned on January 28, 1955, was resumed on Monday, October 10, 1955, at 10:00 a. m., before Honorable Johnson J. Hayes, United States Judge, in the court-room of the United States Post Office and Court House Building, Greensboro, North Carolina.

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(Tr. 345:)

Mr. Freeman: If your Honor please, I do want to state in open court that we have abandoned our counterclaim which has to do with the violation of the antitrust laws. We have also abandoned our defense of misuse, so that this case will now proceed as an ordinary patent-infringement case, and the time that we will consume, I am sure, has been materially reduced.

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(Tr. 347:)

ELIE P. AGHNIDES, the plaintiff, being recalled, resumed the stand and testified further as follows:

Cross Examination (Cont'd) by Mr. Freeman:

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(Tr. 357:)

Q. (By Mr. Freeman:) When you say "foraminous member", might that be a screen?

A. No, with the qualification that if the screen—"screen" is a very broad term, because you can have a wire-mesh screen where the holes are very close to each other, as I explained, and read in my patent, or you can have a screen with a few holes in it. So it could be a screen of a particular type, with a certain number of holes, the required number of holes.

Q. Then do I understand that when you say "a foraminous member upstream of the apertured diaphragm", that has to be something other than a screen?

A. Preferably, yes, I meant something other than a screen, I meant something other than a wire-mesh screen.

Q. Now, so that we understand each other, a restricted orifice would likewise not be a screen?

A. It would not be a screen, a wire-mesh screen.

Q. Would a foraminous member be the same as an apertured diaphragm?

A. Could be.

Q. Well, is it or is it not, in your patent?

A. It could be; you can build it so that it would not be.

Q. I am asking you, in your patent, is it or is it not.

A. You are asking me if two words are the same, and I (Tr. 358:)
am saying I don't know to what you are referring regarding the patent. A foraminous member may not be just like an apertured diaphragm, because you could take a ring, a ring that you are wearing, and put in the aperture and that is an apertured diaphragm in a way, but it is not a foraminous member.

Q. Now that is a good example, but let's get back to the subject here at issue. In your patent is an apertured diaphragm and a foraminous member one and the same, or are they different?

A. I said they could be the same or they could be different.

Q. Indefinite, then; your answer is could be or could not be?

A. No, nothing indefinite about it. If you choose to make it not to be the same, you could do so:

Q. Then, turning specifically to your patent, is your patent, wherein you refer to a foraminous member, the same as the apertured diaphragm?

A. Could be.

Q. Well, is it?

A. Well, the Figue 2 shows there the two diaphragms. They seem to be the same, and you may call either of them a foraminous member or you may call it an apertured diaphragm.

Q. Then we have the answer, that in the patent the terms (Tr. 359:)
"foraminous member" and "apertured diaphgram" are one and the same?

A. Could be. In Figure 2 I have shown it to be so.

• • •

(Tr. 374:)

Q. (By Mr. Freeman:) Will you tell me wherein on Plaintiff's Exhibit 37 there is any indication that you can take either diaphragm, as you call them, as corresponding to the term, a apertured diaphragm?

A. Yes, sir; because either of them is an apertured diaphragm, and the illustration will show that either of them can operate as a diaphragm and give a bubbly stream, and you, yourself, said that the openings in the upper one, the serrated disc, of which the openings are much smaller than the openings in the lower diaphragm, and even then I can demonstrate to this Court and show that the lower diaphragm, just the same, can operate to produce an aerated stream.

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(Tr. 378:)

Q. (By Mr. Freeman:) You can agree with me that a

(Tr. 379:)

disclosure corresponding to Figure 6, an identical disclosure of your U. S. patent, is not found in your Belgian patent?

A. Exactly, no, but the teaching is.

Q. (By Mr. Freeman:) So that the disclosure to the United States Patent Office of Figure 6 was made a few days short of three years after the publication of the Belgian patent; correct?

A. The Figure 6?

Q. Yes.

(Tr. 394:)

A. Yes, but the Figure 6, as we said before, the teachings of Figure 6 were in my Belgian patent, so they were in the original U. S. application.

Q. But the disclosure of Figure 6 in the form wherein you have inwardly extending projections, diagonally shooting the water toward those projections, for impingement

of the water against those projections and breaking the water up was first disclosed to the United States Patent Office more than two years after the publication of your Belgian patent?

A. That specific instruction, yes, but as I said before, the teaching was in the original application and it didn't matter whether you directed your stream sideways to strike the surfaces or you directed it vertically to strike the surfaces.

• • •

(Tr. 400:)

Q. (By Mr. Freeman:) And it is likewise true in connection with Figure 5 of the same patent that you told the Patent Office that valuable results could be obtained even if the screen is omitted, but it is advisable to use it; correct?

A: Yes, because I had made aerators in principle the

(Tr. 401:)

same, not exactly the proportions and dimensions contained in this patent, and I had operated without a screen and with a screen.

Q. In both cases they were aerators?

A. They were aerators.

Q. Now you said something about in principle they were the same, just a minute ago. Will you explain what you mean by that phrase?

A. The mode of operation was the same and the stream produced was a bubbly stream, a white, bubbly stream.

Q. Without screens?

A. Without screens.

Q. And I take it that was in connection with Figures 5 and 6, that's where you made your test of physical devices, in connection with figures corresponding to Figures 5 and 6?

A. Yes.

Q. When did you make such test; that is, where the screen 62 of Figure 6 and the screen 54 of Figure 5 were omitted?

A. Oh, I made those tests in the early stage of my invention, 1934 probably, and all those experiments led me to finding that the screen was the less expensive and most efficient form of dividing-means device.

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(Tr. 403:)

Re-direct Examination by Mr. Ely:

Q. Mr. Aghnides, you were questioned by Mr. Freeman about the terminology of some of your claims of the patent, particularly ones where the two diaphragms were described, but he did not call your attention to Figure 4 in the Aghnides patent nor did he call your attention to this chart, Plaintiff's Exhibit 35.

A. Do you mean Figure 4 or Claim 4?

(Tr. 404:)

Q. Did I say Figure 4? I meant claim 4, claim 4 of the patent. Now in that claim—read that claim.

A. Claim 4 of Patent 2,316,832:

> "A device for producing a jet of water containing air bubbles comprising a chamber (C) the inlet end of which is adapted for connection with the discharge end of a faucet or the like and the outlet end of which is adapted to discharge said jet, superposed apertured diaphragms (23, 24) at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity—"

Q. That's enough. Now on that figure to the right, which is Figure 2 of your patent, how are those two superposed apertured diaphragms marked?

A. Marked by the numerals 23 and 24.

Q. Now come over here to the representation of the Mel-O-Flo aerator and tell us how those are marked again.

A. They are also marked by the numerals 23 and 24.

Q. Now I wish you would mark those two diaphragms with similar coloring as you marked the two diaphragms of Defendant's Exhibit 35, in other words, the upper diaghragm in blue and the lower diaphragm in red.

(Witness marks on drawing.)

Mr. Ely: Now I am going to ask that that reproduction of Plaintiff's Exhibit No. 35 be marked Plaintiff's Exhibit 35-A.

(Tr. 405:)

(Drawing referred to was received in evidence as Plaintiff's Exhibit 35-A.)

Q. (By Mr. Ely:) Now the coloring of those two diaphragms, as applied to the Mel-O-Flo aerator, is the same in Plaintiff's Exhibit 35-A as it is in Defendant's Exhibit 35, is it not?

A. Yes, sir.

* * *

(Tr. 406:)

Q. (By Mr. Ely:) Mr. Aghnides, at various times during your cross-examination, including today, Mr. Freeman has asked you about the lower diaphragm, the one which is marked 24 in Plaintiff's Exhibit 35. Do you have a model which will show that diaphragm?

A. Yes, I do.

Mr. Ely: I am going to ask that this model that I am going to produce be marked Plaintiff's Exhibit 43.

(The model referred to was received in evidence as Plaintiff's Exhibit 43.)

Q. What is this model, Mr. Aghnides; will you show it to the Court and explain what it is?

A. This is a Mel-O-Flo aerator which has at the inlet end a coupling with a restricted orifice. Below that coupling we find a washer, and below that washer we find the two elements inserted one into the other, a ring with an inner element, which is what we have called so far the onion-shaped body. Now in this model I have cut off the part of the onion below the lower end of the ring so as to show that the opening formed with what is left of the cut-off onion and the ring amounts to a very slight open- (Tr. 407:)
ing, which is a diaphragm to produce a stream of water with velocity; and then we can show that this operates substantially in the same way as it did before I cut off the lower part of the onion, especially if I substitute for the cut-off part of the onion, as resistance, an additional screen. The part of the onion which I cut off we call the resistance, one of the resistances inside Mel-O-Flo. Naturally, when I cut it off, the total resistance decreased. Then, to remedy that, I added a second screen to show that this device would operate to produce a bubbly stream.

Q. What is the character of the opening through which the water passes through the lower diaphragm?

A. It's an annular opening. It's very small, so that the water from the faucet will acquire high velocity in order to break up and trap the surrounding air in the mixing chamber.

Q. That opening which you have just shown to the Court, is that the opening which is depicted between the two colored portions of the drawing of the Mel-O-Flo aerator on the left of Plaintiff's Exhibit 36?

A. Yes. Where the onion is still shown, without being blackened, just above the section of the onion we see the annular orifice, and that is the orifice we see here on the actual model of the defendant.

* * *

(Tr. 409:)

Q. (By Mr. Ely:) Now, Mr. Aghnides, I wish you would refer to the passage of the Felten patent which refers to that device as an injector. I think you will find that on page 1, line 25.

A. Yes.

Q. Will you read that, please?

A. (Reading:)

> "The body of the mixing apparatus which of course could also consist of several parts, serves as an injector. It is connected by means of the screw-thread b to the liquid pipe, and the liquid passes through the perforation c, and the gaseous substance, for instance, ozone-air, through a perforation d into the conically widening chamber e, the widening of which produces in a well known manner the suction of the gas from the perforation d owing to the flow of the liquid from the perforation c into the widened chamber e."

Q. That section says that the widening produces in a well known manner the suction of the gas from the perfora-

(Tr. 410:)

tion. Now explain what is meant by suction of the gas from the perforation.

A. It is referring to the mode of operation of water pumps where the velocity of the original stream of water is transformed into pressure, and that falling of velocity and creation of pressure in the chamber, according to Felten, products a suction.

Q. You state that the velocity is transformed into pressure. Just what do you mean by that, Mr. Aghnides?

A. As we see in this exhibit, in Plaintiff's Exhibit No. 45, we have the small orifice on top and below we have a throat or a cylindrical passage, below which we have the widening chamber e. Now the water starts with a high velocity when it enters the device from that orifice on top, and then, as it enters the channel in the conical chamber e, it widens itself so as to fill the conical chamber and the throat and the velocity of the stream naturally falls. We have a very good example of that when we look at the river's flow. At the wide points of the river the water flows very slowly, but when it narrows down we have a very fast flow of water. So here we start with a very fast flow of water and, like the river channel, that channel gradually widens and the water from the orifice on top reaches finally the resistance below throughout its surface, (Tr. 411:)

instead of striking one part and breaking up.

Q. In Felten, does the water strike or impinge against those discs f when the water is in jet form?

A. No, it can not. In the transparent model we have we will demonstrate that.

Q. Quite often, in reference to your devices, you referred to the fact that you had naked jets of water—I think you used the expression "naked jets of water"?

A. Yes, sir.

Q. Do you find, or does the Felten device have within the chamber any naked jets of water?

A. It does not.

Q. Surrounded by air?

A. No.

Q. Now I wish you would refer to your Patent 2,210,846. Is there a reference in there and a distinction made be-

tween your device and injection devices such as in the Felten patent?

A. I remember that there is.

Q. I think if you will look at page 2, column 1, starting at line 35, you will find it.

A. Yes. It says:

> "These effects are apparently due to the extreme thoroughness with which the aeration takes place in my device and the results are quite different from the (Tr. 412:)
> results obtained by ordinary injection devices in which the air is not thoroughly broken up so that when the two fluids leave the apparatus, the air quickly separates from the water jet."

Q. There were you referring to vacuum pumps such as Felten, for example?

A. Yes, to vacuum pumps in general, the injection devices.

Q. Are there any differences—and, if there are any differences, explain what they are—between vacuum pumps and aerators—and for that purpose I think we have a chart here which I am going to ask to be received in evidence as Plaintiff's Exhibit 46.

(The chart referred to was received in evidence as Plaintiff's Exhibit 46.)

Q. Now what differences are there, if any, between a vacuum pump and an aerator?

A. Yes, there is a fundamental difference between these two devices. There is a structural difference; there is also a difference in the mode of operation and function; there is also a great difference in the results.

Q. What devices have you illustrated on that chart, Mr. Aghnides?

A. On this chart, on the left side, we see the cross-section of the Felten device, the Felten pump.

(Tr. 413:)

The Court: That, too, is a pump?

The Witness: Yes, sir.

Q. (By Mr. Ely:) Is that typical of vacuum pumps generally?

A. It is typical of vacuum pumps generally. And on the right side we see my aerator, as illustrated in my Belgian patent, an aerator which is typical of all my aerators.

Q. What is the coloring that you have on there, Mr. Aghnides?

A. I have shown the path of the water by green and the path of the air by red.

Q. Now you said there was a structural difference, or a difference in construction, between a vacuum pump, of which Felten is typical, and an aerator embodying your invention, of which Figure 1 of the Belgian patent is typical. Will you please tell us what the difference in structures is?

A. Well, it will be very clear and easy to see that we do not have the same elements in the two devices. One element which we describe, both Felten and myself, as mixing cha ber, if we draw a line to cut out that portion of these two devices, then we have above that line in the Felten case a whole structure which is designed to create a vacuum, whereas in my device there is no such structure.

Now below, when you compare the so-called mixing chambers of the two devices, we see that in the case of

(Tr. 414:)

Felten the water enters that so-called mixing chamber by

single orifice at the same time as the air. So there is one orifice for the entrance of the two fluids in the mixing chamber of Felten, whereas in my device we have a separate orifice for the entrance of air, shown here by numeral 7, and another entrance or orifice provided for the admission of water into the mixing chamber. Then we don't find, in other words, the same elements in the two devices, because the Felten device has elements there to create a vacuum; the aerator on the right does not have that structure. We can see optically, and also we shall see during the demonstration.

Now we have there the structural differences between the two devices; in other words, the mixing chamber is not the same because we have air entering directly in the chamber, and, above the mixing chamber of each device, there is a portion in Felten which does not exist in my aerator. As a result of this difference in Felten the water enters the device through the vacuum-making portion into the mixing chamber and floods the chamber. So in Felten we don't find one or more naked streams surrounded by air. Contrary to this, in my aerator, we find one or more streams of water surrounded by air, which is due to the fact that in my case the mixing chamber is not flooded (Tr. 415:)

with water because, if it was flooded, first of all, the water would come out of the air vents; second, we wouldn't have those individual streams.

Q. Is there any reason, in the operation of a vacuum pump, why that chamber is flooded with water, as you say; is there any reason or purpose for the flooding of the chamber in the vacuum pump?

A. Yes.

Q. What is it?

A. Without that flooded the vacuum pump would not produce any of the required vacuum. In other words, the

transformation of the high-velocity stream, going through the orifice c, into pressure and flooding of the chamber, forbids or prevents the back-flow of air into the chamber which has been or is being evacuated.

Q. That is to say, this pipe or passage which is marked "d" in Felten, what does that lead to?

A. It leads to some container, containing some gas which is to be exhausted.

Q. What do you say is the function of the flooding of the chamber?

A. The flooding of the chamber is not to allow the back-flow of air into that chamber which is being vacuumized or being evacuated.

(Tr. 416:)

Q. That is to say, were this chamber not flooded, air would find its way back through the open nozzle, back through the channel e, into the chamber being evacuated?

A. Exactly.

Q. What would that do to the functioning of this device as a vacuum pump?

A. It would not be a vacuum pump. If air goes through easily, it can go back very easily. In the case of an aerator there is no vacuum to create, so the air goes through the device very easily, but we don't have to face the shortcoming of that air to go back, because we are not evacuating any chamber. But, in the case of a pump, if the air went down freely and easily in one direction, it would go as easily in another, so the pumps have to provide certain means, have to invent a new device where you can little by little whittle down that vacuum. Time is not such a factor; the idea is to create a vacuum. You can take little by little air so that at no time do you have the danger of the chamber not being flooded.

Q. You say there is no harm in having the chamber e in the Felten device flooded. Now you say the chamber

which is marked 3 in the Belgian patent is not flooded, but has separate streams of water. What is the reason, in your vacuum pump, for not having the chamber flooded? (Tr. 417:)

A. In my aerator, you mean?

Q. What did I say?

A. You said in my vacuum pump.

Q. In your aerator.

A. Because if I flooded the chamber all the water will squirt out through the air vent, number 7, and we won't have streamlets striking the baffles or screens 9 shown in the drawing. If the streamlets can not strike the surface, or screen or baffle, they can not break up into particles and imprison the surrounding air, trap the surrounding air. Felten does not have to have all that; on the contrary, Felten must flood his chamber to create the vacuum.

Q. Then, as indicated by the red and green marks in your aerator, those streams of water, are they surrounded by air?

A. Yes, they are naked streams, surrounded by air.

Q. What about the results of the two devices; is there any difference in the results of the two devices?

A. Yes, the results of the two devices are also radically different. As I was saying before, the pump has to whittle down little by little the air in a container, so the purpose is not to attain a high volume of air, but to attain a vacuum, so there is little air going at any time through the device. (Tr. 418:)

That little air, if it's thoroughly mixed—and it's easier to mix a little air than much air with water—that water will have some bubbles, the stream issuing will have some bubbles, where as in the case of an aerator we have the displacement of a large volume of air, and, due to the fact that the chamber is not flooded, the streamlets strike

the baffles and break up and the whole thing easily and freely goes down and the stream contains many, many more times the proportion of air in the case of my aerator than the Felten. You can not say that this is an aerator because there are a few bubbles. You can not take a glass of aerated water and ten glasses of non-aerated water and mix them and say there are eleven glasses of aerated water. It's not. So here we are facing the same problem. In an aerator the great amount of bubbles bring into intimate contact the water with the air, every particle of water comes into contact with fresh air rapidly flowing through the device. So the aeration is effective and the results are beneficial. In the other case we have some bubbles here and there, but there's not enough of it either be very effective with soap solutions or to improve the quality of the water, and it would be misleading to call the Felten a water aerator, because it would not do the job.

Q. Do these discs in the Felten device, these discs f, have any purpose or function as a part of a vacuum pump? (Tr. 419:)

A. Yes, indeed. I think it would be very hard to flood chamber e in the Felten pump if we took the discs out, and if we didn't flood the chamber e we would find that there isn't much of a vacuum formed, if any. So, even though Felten provided these discs for zigzagging the water and ozone to permeate the water, because he had a chemical operation there and it wasn't a question of a large volume of ozone to go with the water, but a question of sterilizing the water, so that ozone and water stay together as long as possible. So he provided these discs for causing the water to zigzag, but, nevertheless, the function performed by those discs is high resistance, to oblige the streamlet entering through the orifice c to flood the chamber e, because Felten could not get that vacuum with-

out flooding. That also can be demonstrated in this court.

Q. And you said there is no flooding in an aerator?

A. There is not.

Q. What do you have to say with respect to a remark made by the Circuit Court of the Seventh Circuit that, element for element, the Aghnides and Felten devices are the same?

A. Well, I think I have explained at the beginning, first of all, that Felten has a suction-producing section, which is above this line, which we do not find in the aerator. So (Tr. 420:)

there is one element which is not in existence in the Aghnides aerator. Two, when we take the mixing chambers of the two devices below that line, we find elements in one that we do not find in the other; in other words, in Felten's mixing chamber there is one orifice through which your air and water enter that mixing chamber and there is no opening right to the atmosphere that would communicate the outside air with that mixing chamber, whereas in the Aghnides aerator we have independent air vents from the orifices that deliver water in the chamber. So we do not have, element for element, the same thing at all.

Q. Now you have spoken about the proportioning of the resistance to the velocity of the streams entering the chamber in your aerator. Is there any teaching of any such thing in the Felten patent; is there any proportioning of the resistance to obtain the results which you obtain in your aerator?

A. No, I do not find any such teaching.

Q. Now you called attention, I think, to the fact that we had an air inlet into the chamber in your aerator, where there is no such air inlet in the Felten device. What would be the effect if you did put an opening or a passage from the mixing chamber of Felten's vacuum pump to the outside?

A. Well, the Court of Appeals said that it wasn't much (Tr. 421:)
of a job to take an orifice and put it way down—

Q. What orifice are you talking about?

A. An orifice through which the ozone enters in Felten.

Q. That is orifice d?

A. Orifice d—and the transparent model—

Q. Show the Court what you are talking about.

A. The demonstration of this transparent model, where an orifice has been bored below the one normally shown, will indicate that if, in Felten, you open the side wall so that the outside air would communicate with the mixing chamber, the water will squirt out and there will be no air in the stream; the little air that Felten entrains, if we put that orifice way down and substantially above his discs f, we shall see that the water will squirt out of that hole of the lower orifice and that not only water will squirt out instead of air getting in, but we shall also see that the stream resulting, the Felten stream, which has so little air, will have none, indicating that it can not be done.

Q. Indicating that there is a substantial difference?

A. That you can not in a pump lower the orifice for the introduction of air without ruining the pump.

Q. Now the Court of Appeals of the Seventh Circuit said that the two devices, that is, the Felten vacuum pump and your aerator, accomplished the same results, though (Tr. 422:)
perhaps not with equal efficiency. What have you got to say to that, Mr. Aghnides?

Mr. Freeman: Are you asking that as a patent expert, or just his opinion of what the Court of Appeals in the Seventh Circuit said?

Mr. Ely: I am asking him what he has to say as to whether the two devices accomplish the same result, though perhaps not with equal efficiency.

The Court: I will let him go ahead and comment on his view of his device and Felten's, as connected with what was said by the Circuit Court, but, of course, I am not going to let him pass on the law as interpreted by the Court of Appeals of the Seventh Circuit—just what he has to say with reference to these two devices.

A. The results are totally different because—and we can prove it in this court—because the Felten device entrains so little air, and the aerator entrains not only one, twenty, fifty or a hundred per cent more, but hundreds of per cent more. So it's not a question of more or less. You have a new principle, too, which is such a radical difference from the results given by the Felten. We know that, as I have given the example before, the ordinary propeller airplane could go up to three hundred miles; to make it go over six hundred they had to invent the jet (Tr. 423:)
plane. Here we don't make it from three hundred to six, but make it from three hundred to twelve hundred, four times more, so it has to be different, as we shall see during the performance of this demonstration; that, due to the difference in mode of operation and in structure, the results are also radically different.

Q. All right, Mr. Aghnides, I want to go on to something else now. I want you to look at your own vacuum pump, Patent 1,912,113, which was Defendant's Exhibit 15, and I want you to make some comments on that. Incidentally, we have a model of that, Aghnides vacuum pump, which I am going to offer in evidence as our next Exhibit, Exhibit 47.

(The model referred to was received in evidence as Plaintiff's Exhibit 47.)

Mr. Freeman: I wonder if you would identify that, rather than offering it. I am not acquiescing in the offer until I have an opportunity to determine whether or not it is a fair representation of what you say is in the Aghnides patent.

The Court: He can offer it, and, if it's not, we can strike it out.

Q. (By Mr. Ely:) Mr. Aghnides, can you say whether that Exhibit 47 does follow the structure of the Aghnides vacuum pump patent, Patent 1,912,113? (Tr. 424:)

A. Yes, it does.

Q. Now I would like you to refer to some passages and make some comments there as seem pertinent. I want you to refer first to the paragraph beginning in line 5, column 5, page 1 of the patent, "One object," and so forth.

A. (Reading:)

> "One object of the invention is to do away with the very long or long outlet tube that it was always necessary to provide to prevent the inrushing back of air into the vacuumized vessel."

Q. What are you talking about there, Mr. Aghnides? Explain that a little more.

A. Yes. Vacuum pumps have a problem. In order to prevent the inrushing, the downward moving of the air, they have to be really effective, because the purpose is to create a high degree of vacuum—and those water pumps used in laboratories had a long stem and, in addition to that long stem, they used to attach a tube to make it even longer, so that the flooded chamber would be as long as possible and the piston effect would be as effective as possible, to prevent the back-flow of air into the chamber to be evacuated.

Q. Is that what you mean by flooding; the piston effect and flooding, are they synonymous?

A. Yes; in other words, the flooding creates the piston effect.

(Tr. 425:)

Q. And the purpose of the piston effect, as I understand it, is to prevent the return of any air into the chamber or whatever is being evacuated?

A. Yes, that's right.

Q. And that is what you are talking about here when you say "to prevent the inrushing of air back into the vacuumized vessel"?

A. Yes; but there is no such problem with an aerator.

Q. I want you to call the Court's attention to that portion of the patent beginning with line 25, page 1, column 1.

A. Yes. It says:

> "One realized in that manner a particular path for the liquid, path which is characterized in that it is curved without breaking or fragmenting the flow of the liquid."

Q. What do you mean by fragmenting; breaking up the liquid?

A. Yes, sir; while, in an aerator, the more we fragment and the more we break up, the better results we have. In a vacuum pump, the stream produced would be so soft, so vulnerable, the air from outside would go right into the chamber being evacuated. That is why, in this pump of mine, that onion-shaped body 8 is in the center, so that the water going down through the conical channel 7, without breaking, without fragmenting itself, can surround the onion and go down.

(Tr. 426:)

Q. With the result that you create a vaccum pump in a much shorter space?

A. Yes, sir; and that onion-shaped body 8 permitting also the flooding of the conical chambers.

Q. Does it also create the flooding; does it assist in creating the flooding?

A. Greatly, of course.

Q. So that in the body of your vacuum pump shown in this patent there was no breaking up of the water in the interior of the chamber?

A. It operated like the usual water pumps.

Q. Whereas, in the body of your aerator, such as shown on the chart, the water is broken up?

A. The water is broken up, surrounded by air and—

Mr. Freeman: I don't object to the leading question, except that we ought to identify the chart so we will know later on which one we are talking about.

Mr. Ely: I think you are right. The chart, Plaintiff's Exhibit 16, is the one we are talking about.

• • •

(Tr. 427:)

Q. (By Mr. Ely:) Mr. Aghnides, the first thing I want you to do is to take the model, Plaintiff's Exhibit 43, that is, the Mel-O-Flo with the bulb or onion cut away, and mount it so that you can show the Court what kind of a stream is projected by the lower diaphragm. Tell me what you are doing first.

A. I am taking out of the Mel-O-Flo the ring, which, in combination with the central body, forms the two dia-

(Tr. 428:)

phragms, and I am putting it in a cutaway body so that

we can see in which form the streamlets emerge from the annular orifice of the lower diaphragm. I am attaching it to the central faucet and we shall turn the water on at the same pressure on the gauge there as we had demonstrated before, that is, 30 pounds. Will you turn the water on? (Demonstrating.)

Q. Now shut the machine down so that you can be heard.

A. We have seen—and we shall open the faucet again to see it again, so that in the meantime I can explain what we have seen—we have seen the water conically emerging from the lower diaphragm and that water was broken up into streamlets, due to the fact that the serrated diaphragm above the lower diaphragm has little openings through which the water went, went downward and came out of the annular orifice with all the impact of the diaphragm on top, the second diaphragm. Now, if we turn the water on, with a flashlight we can look closely and we can see that the stream coming is not a continuous skirt, but it is all divided into streamlets (demonstrating).

Q. Now the next thing I want you to do, Mr. Aghnides, is to put that mutilated device with the bulb cut off, put it in the regular casing of the Mel-O-Flo and let's see what happens. Now when you have cut away the lower (Tr. 429:)
part of the bulb what have you done to the resistance in the regular Mel-O-Flo?

A. Well, I take away a part of the total resistance so that the resistance is less now, and the jet is not as thoroughly done, as the stream issuing will show (demonstrating). So we have seen a white stream of water, not too even, which was due to the streamlets we have seen issuing when you operated the two diaphragms without the main body. Now if we put an additional screen to what there

is already, then we shall compensate in a practical way for the cutting off part of the onion and the stream will be a little better.

Q. In other words, you are going to replace the resistance which you took away when you cut off the lower part of the onion, you are going to replace that with a resistance set up by an additional screen; is that right?

A. Yes, substantially, in an easy way. It is not accurate and total replacement.

Mr. Freeman: I could save some time if I could ask him whether that screen is placed right on the other screen, or is there a spacer in between, a relative positioning of one with the other. Otherwise I am going to have to ask that these demonstrations be done over.

The Court: I will let you ask him now.

The Witness: Well, sir, your screen has to be (Tr. 430:)

kept in position by one ring. That ring seems to be a sixteenth of an inch high, I don't know exactly. I am going to put my screen on top so that they will be slightly spaced. We can push it down so they will touch each other, but in this case it will be immaterial because we are just going to prove a principle and total perfection in a temporary demonstration is not possible, because we have got half an onion and we are putting a screen. Even then we shall see that the ultimate stream will be somewhat evened up (demonstrates).

Q. Now cut off the machine and tell us what happened.

A. We had a rather nice stream which was soft and full of bubbles, as the glass test showed and as the jar we put in the stream was covered with a non-splash, bubbly stream.

Mr. Ely: I suppose I should mark this as Plaintiff's Exhibit 43-A, with the added screen. I only had 43 without the added screen. I will make this 43-A with the added screen.

(The model referred to was received in evidence as Plaintiff's Exhibit 43-A.)

Q. Now let's take the standard Mel-O-Flo, with the ring and disc and onion all in place, take those parts out, put them in your holding ring, and run the tank so we can see the character of the streamlets as created by the standard Mel-O-Flo ring and diaphragm.

(Tr. 431:)

The Court: What exhibit?

Mr. Ely: This is Exhibit 19.

A. Here I have the Mel-O-Flo and I shall take out the ring and the element placed into that ring and locate those two elements in the cutaway ring and attach it to the faucet to see the nature of the streamlets issuing from the lower diaphragm (demonstrates). One can see very well the individual streamlets issuing from the lower diaphragm in a skirt-like stream.

Q. There is a large center stream, in addition to the—

A. Well, that center stream is due, according to my own understanding, to the fact that some of the water follows the round shaped onion and goes down to the lower center of the onion and projects itself in a more substantial form of a stream.

Q. But the water, as it is issuing from the lower diaphragm, is in what form, as shown in this demonstration?

A. Well, they are atomized, they are divided into fine streamlets; in other words, the character of the stream-

lets issuing from the upper diaphragm is found in the ultimate issuing streamlets.

Q. Now, Mr. Aghnides, you will recall that during your cross-examination at the session in January you made the statement, I think, to Mr. Freeman that the space between (Tr. 432:)
the two diaphragms was filled with water and, as I recall it, he expressed some doubt about the subject. Do you have a model here which will demonstrate whether your testimony was correct or not?

A. I do.

Mr. Ely: Before we do that, I am going to mark that holding ring as Plaintiff's Exhibit 48.

(The ring referred to was received in evidence as Plaintiff's Exhibit 48.)

Q. Now what are you going to produce, Mr. Aghnides?

Mr. Freeman: Could I ask one question?

Mr. Ely: Yes, sir.

Mr. Freeman: The one you have just demonstrated had to do with the upper and lower diaphragms; correct?

Mr. Ely: Yes, we had your complete insides.

Mr. Freeman: In connection with the upper and lower diaphragms, or the superimposed diaphragms of the patent in suit, the first one only has one diaphragm?

Mr. Ely: I think we all understand that.

Mr. Freeman: So, as I understand it, the demonstration you have made with those two diaphragms and cutaway model has to do with the second patent in suit?

Mr. Ely: No; has to do with the first patent, where it says the stream of water issues with sub-
(Tr. 433:)
stantial velocity from the diaphragm into the chamber.

Mr. Freeman: Whether through the two diaphragms or the one?

Mr. Ely: Yes; as far as infringement is concerned, the upper diaphragm in your device answers to the diaphragm in the first patent.

* * *

(Tr. 434:)

Mr. Ely: He will do it when we get through here. I have forgotten where I was, but I asked him if he had some means of demonstrating whether the space between the two diaphragms in the Mel-O-Flo aerator was flooded. He said he did and produced this device.

(Tr. 435:)

Q. (By Mr. Ely:) Tell what it is, Mr. Aghnides.

A. This device is a Mel-O-Flo, in other words, the inner parts, the ring and the elements placed in the ring. This Mel-O-Flo was purchased in New York. We have made a hole from the bottom of the onion upward so that we would reach the space between the onion and the upper serrated part, so that when this element is placed in the ring we have the regular elements of the Melard ring and onion, but equipped with a pipe in the center of the onion leading into the space between the onion and the serrated disc, to prove to this Court that that chamber there is full of water.

Q. You said "that chamber there."

A. Between the two diaphragms, is full of water.

Q. All right, put it on.

A. (Demonstrating.) Then we see water squirting out of that pipe leading into the space between the two diaphragms.

Q. What does that prove, Mr. Aghnides?

A. That proves that that space between the two diaphragms is full of water, and that pipe reaches the center of that space, so that it would not be too near to the serrated orifice. In other words, under the worst conditions for our purpose, it still shows that that chamber is flooded.

* * *

(Tr. 437:)

Q. (By Mr. Ely:) Mr. Aghnides, do you have a way of demonstrating a Mel-O-Flo aerator with a lower diaphragm only?

A. Yes.

Mr. Ely: I don't know whether I introduced that model with the gooseneck.

The Court: I don't think you did.

Mr. Ely: I am going to ask that it be received as Plaintiff's Exhibit 49.

Q. (By Mr. Ely:) Now will you demonstrate the Mel-O-Flo with the lower diaphragm only? Tell us what you have there, Mr. Aghnides.

A. I have there, I am holding, the inner ring of the Mel-O-Flo with the center piece which has the onion in the serrated part, only I have cut away from the serrated part enough so that the lower part would operate only as the lower diaphragm. So this is to prove that the annular orifice below, formed by the onion and the ring, operates as a diaphragm, because we will not have this time the cooperation or existence of the upper diaphragm, having

cut off a major part of it. I am going to put this unit into the cutaway ring and fit it on the tap. (Demonstrates model.)

(Tr. 438:)

Mr. Freeman: Are those individual jets coming out now?

The Witness: Many of them.

Mr. Freeman: Are they formed by the lower ring, which is the continuous annulus open, or are they formed by the four pieces you cut away from the upper diaphragm, the serrated diaphragm?

The Witness: If you will observe, you will see that where the four legs are we have streams going in a more divergent way from the other streams which are in between, formed completely by the annular space.

Q. (By Mr. Ely:) Why do you have those four legs on there, Mr. Aghnides?

A. Simply to hold it in position, because it would not stay in the ring if I had cut off completely the serrated part.

Mr. Freeman: Can I ask you to drop the upper diaphragm having the serrated edges and the onion and ring in the normal casing of the kind used by Mel-O-Flo and then demonstrate it?

The Witness: Demonstrate this with the Mel-O-Flo aerator?

Mr. Freeman: Yes, with the screen below.

Mr. Ely: That is what I was going to do next. Go ahead.

The Witness: Now I shall put this element we

(Tr. 439:)

have just demonstrated in the normal body and

demonstrate to show that the lower diaphragm by itself produces a stream of water, or streamlets of water—it doesn't matter—and breaks on the resistance which is in its path, which is the onion and wall and screen, to give aerated water. Of course, I must add that this will not be a perfect stream, because the proportioning of resistance by Melard structures was not made to operate with that lower diaphragm alone, but it will show, nevertheless, that that diaphragm alone has a sufficiently small orifice to produce streamlets of high velocity, able to draw in air and give a bubbly stream. (Demonstrates model.) We saw the white stream, with air, rather harsh, simply because the resistance has not been proportioned to give the best results in this construction. I may note that we have seen that that annular orifice is plenty strong to give high velocity and draw in a tremendous amount of air.

Mr. Ely: I am going to ask that that latest model we have tested be marked Plaintiff's Exhibit No. 50.

(The model referred to was received in evidence as Plaintiff's Exhibit 50.)

• • •

(Tr. 448:)

Mr. Ely: I wanted to summarize this last series of tests made at the behest of Mr. Freeman.

Q. (By Mr. Ely:) That is to say, you started out with the regular screen at the end of the Mel-O-Flo aerator, then put one more screen, making two, and then another one, making three; so you had three screens finally?

A. That's right.

Q. Was there any progressive improvement in the character of the stream as you added each of those successive screens?

A. Definitely.

Q. You wound up with what?

A. We wound up with a regular aerated, bubbly stream.

Q. Then you had a device in which you had an upper diaphragm, did you not?

A. Yes, sir.

Q. Delivering streamlets of water under pressure and (Tr. 449:)
at substantial velocity into a chamber—did you not?

A. I did.

Q. And you had then streamlets striking the resistance, did you not?

A. Yes, sir.

Q. What was that resistance, what form did that resistance take?

A. It was in the form of a screen.

Q. A screen or screens?

A. A screen at first, and then we added the second and the third screens.

Q. What you were doing, then, when you added each successive screen, you were proportioning the resistance to the velocity of the streamlets as they issued from the upstream diaphragm; is that correct?

A. Exactly.

Mr. Ely: I am going to offer that device with the three screens in evidence as Plaintiff's Exhibit 52.

* * *

(Tr. 450:)

Q. (By Mr. Ely:) Mr. Aghnides, there was considerable discussing during your cross-examination by Mr. Freeman as to the purpose of a restricted outlet as an element for forming a coherent stream. You remember that part of your cross-examination, do you?

A. Very well indeed.

Q. Do you have any model which you can demonstrate which shows whether or not it is necessary to have a restricted orifice, restricted outlet, in order to have a coherent, bubbly stream created by an aerator of your invention?

A. Yes, sir, I have here an aerator made according to the teaching of my Figure 1 of my Belgian patent, in which there is no constricted orifice below the resistance means; in other words, after the screen there is no restriction or constriction of the orifice. The inside of the device is of the same diameter.

* * *

(Tr. 452:)

The Court: The body, at the place where the screens are inserted at the lower end, is virtually the same as it is above the point where it is restricted?

The Witness: The same as it is above the screens.

* * *

(Tr. 453:)

The Court: The only reason I asked you any questions was to find out if the example that you use is shaped like it is drawn in Figure 1 of Plaintiff's Exhibit 46.

The Witness: It is, exactly.

The Court: That is all I wanted to know. Put it together and we will see it operate.

Mr. Ely: Let's mark that Plaintiff's Exhibit 53.

(The model referred to was received in evidence as Plaintiff's Exhibit 53.)

The Witness: This is the coupling to attach to the aerator and then to the faucet. (Demonstrates model on faucet, with water turned on. Here we have a bubbly stream without any restricted orifice,

and it shows that when you put the jar below it envelopes it with bubbles.

* * *

(Tr. 457:)

Q. (By Mr. Ely:) Mr. Aghnides, do you have any means of determining the degree of vacuum that vacuum pumps create?

A. Yes, here we have a gauge showing thirty degrees, which is total vacuum.

Q. Thirty inches?

A. Thirty inches of mercury, which means total vacuum at sea level. It is very difficult, if not impossible, to create complete vacuum, so all the vacuum-creating devices come very near to it but do not obtain the perfect vacuum. That has been one of the big scientific problems, a perfect vacuum. We shall see now that the Felten device and my own pump create seventy to eighty-five percent vacuum, depending on the vacuum pump operating.

Q. Now will you first take the Felten model, Plaintiff's Exhibit 54, and demonstrate the way in which it performs?

A. I am fastening now the Felten pump, made out of transparent material, on the central faucet, to the faucet in the center. Now I am connecting the lateral tube on

(Tr. 458:)

Felten's pump with the vacuum gauge to see the degree of vacuum it is able to create. (Demonstrates model on faucet.) We have there twenty-five inches of mercury.

Q. And what was the character of the stream that was issuing from the vacuum pump?

A. There was no air in the stream.

Q. And that is the way in which the device is intended to operate, to be connected to some vessel to be evacuated?

A. That's right; that is why that lateral pipe is provided.

Q. Now will you take your own vacuum pump, Plaintiff's

Exhibit 47, and will you demonstrate the manner in which that operates?

A. Yes. (Demonstrates model on faucet.) Now we are operating my own vacuum pump under the same pressure and the gauge shows that it creates a vacuum of twenty-five inches of mercury, and the water has no bubbles, has no air in it.

Q. Now, Mr. Aghnides, are you prepared to make somewhat similar tests with the Spring-Flo and the Mel-O-Flo aerators?

A. Yes.

Q. Please tell us first about the Spring-Flo aerator.

A. Well, the Spring-Flo aerator is not a vacuum-producing device. The Spring-Flo entrains a large volume of air, much larger than the vacuum pumps, and yet it creates very little vacuum, if any. We shall see that it will (Tr. 459:)
create about one inch of mercury against the twenty-five inches we have seen with the pumps.

Q. How do you propose to do that, Mr. Aghnides?

A. Well, I take a regular Spring-Flo and put a channel around it and a lateral pipe, to be able to connect it to the vacuum gauge. Now I am showing the inside of the Spring-Flo, which is a regular production Spring-Flo, the main body, the slots connecting with the channel and the pipe thereon. Then we have the two screens which go into the main body. On top of the screens we have the perforated disc in the shape of a cup; and then we have the second diaphragm, which is the second patent, with a washer around; and this is the Spring-Flo of commercial production.

Q. That is the one that is made by Chase Brass, is it?

A. That's right. To permit better sealing on top, I am putting a washer. Now I am attaching this aerator to the faucet in the center and I shall run it first to show to the Court that it operates normally, under its normal condi-

tions, when the lateral pipe is not connected to the vacuum gauge. (Demonstrates model on faucet.) Here we have the usual bubbly stream given by Spring-Flo.

Now I shall connect this device with the vacuum gauge. Here I have a coupling, one end of which is large enough (Tr. 460:)

to engage into the pipe attached to the Spring-Flo and the other end to engage into the pipe leading to the gauge. Now will you turn the water on (demonstrates)?

Here we see that the vacuum created is above an inch. The stream has no air incorporated and we have very small vacuum, which, in practice, amounts to lifting the water a foot to foot and a half high, whereas in the case of vacuum pumps it amounts to lifting the water twenty-five to thirty feet high, which is a considerable amount of work, and that work, of course, energy is coming from the water pressure, which means that the pumps waste that energy, or utilize it for creating vacuum, whereas in the case of aerators we see there is no vacuum produced on a practical scale and that all the energy is made available for the areation of water.

Mr. Ely: I want to offer the Spring-Flo aerator with the collar as the plaintiff's next exhibit, and I have lost sight of the exhibit numbers.

(The model referred to was received in evidence as Plaintiff's Exhibit 54.)

* * *

(Tr. 468:)

Q. (By Mr. Ely:) Now I guess we are ready for the Mel-O-Flo, and we are going to make the same test as with the Spring-Flo. Take that apart and tell us what you have.

A. Here we have the commercial Mel-O-Flo aerator which has been equipped, as in the previous case, with a collar and with a lateral pipe which permits the connection of the

vacuum gauge, and we have the inner parts. First we have the complete Mel-O-Flo aerator—

Mr. Freeman: Which patent is this to demonstrate?

The Witness: The two patents. (Demonstrates with model on faucet.) We have now the Mel-O-Flo operating with air-admission orifice open, so that we have a soft, bubbly jet.

Q. (By Mr. Ely:) Now what are you doing?

A. Now I am connecting the Mel-O-Flo with the vacuum gauge.

Q. Through that adaptor?

A. Through that adaptor, for that same reason as I explained before, because the pipe is too small. (Demonstrates with model on faucet.) Here we have hardly any vacuum created.

Q. What did the gauge show?

(Tr. 469:)

A. The gauge didn't show anything to me.

Q. Why did you run your hand over it?

A. To perfect the sealing, so that there will be no air entering the aerator from other parts.

Q. Let's take that off—

Mr. Freeman: Give him a chance to run it now with the same test as you made with the other device.

Mr. Ely: I will introduce it as Plaintiff's Exhibit No. 55.

(The model referred to was received in evidence as Plaintiff's Exhibit 55.)

Mr. Freeman: Will you run the device now with the tube leading to the adaptor of the vacuum gauge being removed?

(Witness demonstrates as requested.)

Mr. Freeman: Now will you take the adaptor off?

(Witness demonstrates as requested.)

Mr. Freeman: Would you take your scale that you had and seal about half of the opening that now extends out from the device?

(Witness demonstrates as requested.)

Mr. Freeman: Does that make any difference?

The Witness: I don't see any difference.

Mr. Freeman: Will you seal off about three-quarters, by your naked eye?

(Tr. 470:)

(Witness demonstrates as requested.)

Mr. Freeman: Does it make any difference?

The Witness: I don't see any difference.

Mr. Freeman: Will you seal off a little more?

(Witness demonstrates as requested.)

Mr. Freeman: Does it make any difference?

The Witness: I don't see any substantial difference.

Mr. Freeman: Will you seal off just a little more, Mr. Aghnides, please.

(Witness demonstrates as requested.)

Mr. Freeman: Does it make any difference that you can see?

The Witness: I don't see any substantial difference.

Mr. Freeman: That's all.

The Court: Close it up and let's see what it will do.

The Witness: (Demonstrating as requested.) Now it makes a difference.

Q. (By Mr. Ely:) Just for the sake of the record, what was it you did in response to Mr. Freeman's request and what were your observations?

A. Well, Mr. Freeman wanted to see, if we decreased the air orifice little by little—

Q. What air orifice?

* * *

(Tr. 471:)

Mr. Freeman: I noticed that you didn't run the Felten model by itself, without the vacuum-testing rig attached to it.

Mr. Hamilton: We are just getting to that.

Q. (By Mr. Ely:) Now, Mr. Aghnides, will you please put the Felten model, Plaintiff's Exhibit 44, on the tank and operate it and show to the Court the character and volume of the stream produced. In this case I want the opening which is normally connected to a chamber to be evacuated to be open to the atmosphere and I want the pin which is halfway down the device left in place.

A. Now we have the Felten pump without the lateral pipe being closed; it's open to the atmosphere, which wasn't intended to be, but we are going to operate it so that, instead of ozone and air, air alone, atmospheric air alone, will go through:

(Tr. 472:)

Q. That is, there is a free admission of air from the atmosphere into the interior of the device; is that correct?

A. That's right. (Demonstrates with model on faucet.)

Q. Tell us the character of the stream.

A. We have a stream which contains some air. I shall give the glass test. When the glass is filled it doesn't empty itself out rapidly, showing that there is very little air in the Felten stream.

Then we shall test now with the jar, and we shall see that the Felten stream does not splash and it does have some bubbles.

Now I should like to show that if we have an ordinary stream of water flowing in such small quantity it will not splash either. (Demonstrating with stream from faucet on jar.)

Q. What is it you are doing now?

A. In other words, I am showing here to the Court that the splashing of the water becomes a problem when you have a big volume of water coming out, in other words, when you have water coming under high pressure. Here in the case of Felten we have seen when we filled the glass, which took a few seconds, there is very little water flowing, so the non-splash nature of it is a granted matter.

Q. What did your glass test show with respect to the (Tr. 473:)
amount of air?

A. Well, the glass test showed that there was very little air in the stream.

Q. Now I want you to turn that on again. I want you to point out to the Court again what the condition on the inside of that conical chamber is with respect to the amount of water and so forth.

A. Now the purpose for making this pump transparent is to show what is going on inside, in other words, the mode of operation of a water pump. We can see clearly that the throat, as well as the widening conical chamber, both are full of water. According to Felten, this construction of this pipe and the widening part—

Q. "This pipe"—will you say what you mean by "this pipe"?

A. The throat under the orifice and the widening part below are responsible for the creation of a vacuum, the vacuum that we have seen a while ago that attained

twenty-five inches of mercury. That construction just referred to does not exist in the aerator. If it did the aerator would squirt water out on the sides.

Q. Now, Mr. Aghnides, did you observe in there any individual streamlets going down through the chamber in the lower part?

(Tr. 474:)

A. I was coming to that. We have seen, and we shall again, that the stream of high velocity, flowing from the upper orifice, floods the lower part, the throat and the channel. In other words, that single jet coming out of the orifice never reaches the baskets, because of the space which is over a third of the total height of the device from the baskets, all that space is filled with water and some air, so that that streamlet of high velocity created from the orifice of the Felten pump is unable to reach the basket, strike it and break itself into fragments, because that streamlet of high velocity flows in a filled-up chamber and it is unable to reach. Therefore it is known in physics that the velocity of a stream is inversely proportional to the opening. A practical illustration of that we have in a river. When the river is wide the water is flowing slowly, and at the parts it's very narrow it goes fast. Here the very narrow part becomes very wide and the whole thing is flooded. In other words, as the water strikes the basket it has hardly any velocity and there is no breaking up; there is no stream surrounded by free air, there is no naked stream.

Now if in a pump we didn't have that condition—I think we can demonstrate also the point I am going to say—If we destroyed the condition of flooding, even though we

(Tr. 475:)

would have the condition there, we would not have any vacuum created. So it is very important for a pump that

velocity is transformed into pressure to create the piston effect to prevent the back-flow of air and create a vacuum.

Q. Now, Mr. Aghnides, do you have any visual way of demonstrating the flooding of that chamber, that widening conical chamber in the Felten vacuum pump?

A. We have seen it flooded visually. Now if we close the lateral orifice we shall see again it is filled with water. Whether the lateral orifice now admitting under these conditions air is open or closed, that conical chamber in Felten is always flooded with water.

Q. Now I want you to do that; I want you to hold your finger over the end of the pipe d in the Felten pump; I want you to start the device, and then I want you to remove the side plug which is part way down the device and see what happens.

A. (Demonstrating as requested.) Now we have a stream of water containing no air at all, because the air vent or the lateral pipe has been closed. Now I am going to show that if that lateral pipe was in a lower position than it is now, instead of getting any air in, water will squirt out. (Witness demonstrates.) Then the entire function of the pump has been destroyed by putting that lateral orifice at the lower position. Then we saw that (Tr. 476:)

there was no air in the water, which would mean there would be no vacuum creation, and we also saw what is impractical, the water squirting out of that lower orifice.

Q. What about what the Court of Appeals said, that if in practice it is proved desirable—that lower placement, speaking of the lower placement of the air inlet—it does not amount to invention. What does this demonstration show with respect to that?

Mr. Freeman: That happens to be a matter of law. I don't object to him making any demonstration he wants to make.

The Court: I will let him describe what happened. Go along. I will give you an exception.

A. Well, we have seen here that, because of the inner construction of the water pump, the Felten water pump, we can not indiscriminately select the position of the air vents—

Q. The air inlets, you mean?

A. The air inlets—between the so-called resistance and the orifice delivering the stream of high velocity. It has got to be where it is, because, if you lower it, we have seen what will happen. The pump will be no more a pump; the pump will not become an aerator, and the whole thing has been destroyed and has become useless; whereas, in the case of an aerator, the orifice letting air into the cham-
(Tr. 477:)
ber can be anywhere, simply because the aerator does not have that vacuum-producing portion, that flooded portion.

Q. You did, I think, demonstrate at our previous hearing one of your aerators with the portions cut away—do you recall that? That was Plaintiff's Exhibit 39, a Velva-Flo aerator.

A. Yes.

Mr. Ely: I wonder, Mr. Hamilton, if you will produce that and we will make a comparative test right now.

Q. Now, on Plaintiff's Exhibit 39, is the side wall of the aerator cut away?

A. Yes, it is.

Q. Now it is cut away, and the conditions are somewhat similar to the conditions when you removed the pin from the side of the Felten vacuum pump?

A. Yes, sir; it is even more so, because here we have practically no wall at all between the resistance and the

screens in the upper diaphragm; it's open all around. It also is very important to notice that when construed that, element for element, it is the same thing, we can see that there is no element except the open atmosphere between the screens and the diaphragm, whereas here, between the baskets and the orifice in Felten, we have different elements which Felten himself describes as being resistance (Tr. 478:)

for the vacuum creation. (Witness demonstrates with Exhibit 39 on faucet.)

Now one can see clearly the streamlets, individual streamlets, delivered by the diaphragm in the aerator with the side completely open, each streamlet being surrounded by fresh atmospheric air, and the delivery of a highly aerated stream without any flooding in the aerator chamber, because, if there was such a flooding, the water would come out from that cutaway portion. We have already demonstrated that if we increased the resistance we could create a flooding.

Q. In other words, comparing the two devices, that is, your own aerator and the Felten vacuum pump, will you say what is the condition of the water as it is flowing through the chamber in your aerator?

A. Yes, we can see with naked eyes the mode of operation in the two devices. We can see that in one case the inside is flooded, in the case of the Felten pump, between the resistance and the diaphragm, whereas in the case of the aerator it is not flooded and we have a perfect aeration.

The Court: It's open all the way except for the two sides there that hold it up?

The Witness: Yes.

Q. (By Mr. Ely:) Whereas, if you open the side-wall of the Felten pump, water flows out, does it not?

(Tr. 479:)

A. As we have seen in this a while ago.

Mr. Freeman: Can I ask if it would make any difference if you had a plurality of openings all around the Felten device when you started it up?

The Witness: Water would come out through the plurality of those openings.

The Court: What keeps that water from going out of those openings there?

The Witness: Because, according to the teaching of the patent, the resistance below the diaphragm delivering those streamlets we have seen is smaller than the velocity of the streamlets, so the whole thing breaks and goes down. If your Honor remembers, last January we demonstrated that if we added more screens than we have now—I think we had to add three more screens with the regular Velva-Flo to flood it immediately. So this being built according to the teaching of the patent, there is a proportioning of the resistance, of the means of breaking up, with the stream velocity coming out of the diaphragm.

Q. Now, Mr. Aghnides, I want you to run the Felten vacuum pump and want you to call his Honor's attention to the condition of affairs in the throat, by which I mean the portion leading from the inlet end that's attached to the

(Tr. 480:)

chamber to be evacuated to where the chamber starts to widen. I want you to put your finger over the end of pipe d in the patent, run the device, and call the Court's attention to the character of the water in the throat and then in the body.

A. (Demonstrating as requested.) One can see now that there is no air in the stream and the water in that portion

which we call the throat is slightly whitish, due to the high degree of vacuum created, some vapor being created, and we see the conical chamber, as well as the throat, completely filled with water.

Q. Now there is one thing I want you to do, Mr. Aghnides; I want you to remove the baskets from the lower end of the Felten pump.

A. I think it has been stated by me over and over again, this question of flooding being essential to create the vacuum and that these baskets offer the resistance, like the onion in my own water pump offers the resistance necessary to flood the inside of the pump. Now I am going to prove that if that inside is not flooded we don't have vacuum. To do that I am going to take those baskets out.

Q. You have taken the baskets out and put the nozzle back on?

A. The nozzle back. (Witness demonstrates with model on faucet.)

(Tr. 481:)

Q. Now what is the condition of affairs?

A. Well, we see now that jet of high velocity in Felten goes right through, widening somehow, and there is no flooded chamber inside, and we are going to see now that if we connect this device with the vacuum gauge we will not have much of a vacuum, if any.

Q. Now what are you doing?

A. Now I am attaching this vacuum pump of Felten, without the baskets, otherwise identical, to the vacuum gauge. (Demonstrates model on faucet.)

Q. Now tell me just what you did.

A. I connected it with the vacuum gauge, without the baskets, and the gauge did not show any vacuum creation; there was no vacuum created because the inside was not flooded. The air entrained was going as easily back. Never

the proverb, "Easy come, easy go," has been better applied. So it was as freely going one way as another, and we had no vacuum.

Q. There was no piston effect?

A. No piston effect, no vacuum.

Q. Now what are you going to do?

A. Now I am going to create some flooding very rapidly and you will see that even in the absence of baskets, no matter what you did to flood, whether it is the Felten baskets or the onion in my pump, when the flooding is created, then we have vacuum. (Demonstrates with model (Tr. 482:)
on faucet.)

Q. Tell us how you are going to do that.

A. I am going to put the glass under the Felten, so as for a few seconds the water will fill the lower part, and then I will withdraw the glass, so that we will have a condition where the Felten pump is flooded and vacuum starts to be created again. (Witness continues demonstration with glass placed under faucet so that water in glass reaches and covers discharge end of faucet.)

Now we have seen that, without the baskets in the Felten, when the flooding has been restored, as I explained before, the Felten pump created a vacuum equal to what it created before with the baskets, but we have seen also that when there is no flooding there is no vacuum. That is one of the conditions of the water pumps and they have been conceived and built that way; they have to do it; otherwise they don't operate as intended to operate, to create vacuum.

Mr. Freeman: What would happen if you put one basket in?

The Witness: I will do it, if you would like to see it.

Mr. Freeman: Yes, I would like to see it.

The Witness: What we obtained by flooding artificially, we shall try to see if that same result can be effected by one basket. (Witness demon-
(Tr. 483:)
strates model with one basket inserted.)

Mr. Freeman: Now will you take the vacuum-test gauge off?

(Witness complies with request of counsel.)

Mr. Freeman: You are getting some aeration now, aren't you?

The Witness: Yes. We did get some with four.

Mr. Freeman: You are getting far better with one basket than you did with the four?

The Witness: Some better, yes, sir.

Mr. Freeman: You are getting water coming out which is whitish in color, aerated?

The Witness: Now.

Mr. Freeman: Would I do better if I had two openings for air inlet instead of one?

The Witness: If there is such a pump available we shall be glad to test it, but I do not think that would make such special difference as we have seen with the aerators.

Mr. Freeman: Would you be kind enough to hold your finger on the normal air inlet of what you call the pump and then take the little plug out you put in as an extra, and then demonstrate it with only one basket in it? Now put your finger on it and start it up without the plug.
(Tr. 484:)

(Witness complies with request of counsel.)

Mr. Freeman: Is it giving a relatively good aerated stream now?

The Witness: It's a much grayer stream delivered when the orifice was above, and we see some water coming out of the orifice.

Mr. Ely: What orifice? Out of the lower orifice.

Mr. Freeman: What would have happened had you had two orifices, so that you had twice the admission of air into the device than what you have there?

The Witness: Well, we would have had more air coming out—more water coming out.

Mr. Freeman: More aerated water?

The Witness: No; more water coming out the lower orifice.

Mr. Freeman: Is it your position, Mr. Aghnides, that with the extra openings you put in this model you would have more water coming out?

The Witness: Yes.

Mr. Freeman: Would you have more water coming out if you moved the opening down a little bit?

The Witness: If we move further down the opening?

Mr. Freeman: Yes, sir, toward the downstream end.

The Witness: More water would come out. (Tr. 485:)

Mr. Freeman: If you moved it up a little would you have more or less water coming out?

The Witness: Have less.

Mr. Freeman: So it does depend on where you put the opening as to the amount of water that would come out?

The Witness: Yes, sir; in other words, the displacement of water in the pump shows that the more you lower it, the more water will be spitting out of the orifice and the less vacuum will be created.

Mr. Freeman: In order to be fair, I'd like to have you put in two baskets and let's see what happens. This is all news to me, so I am asking only as a matter of enlightenment.

The Witness: (Demonstrating with model as requested.) Now we see clearly there is hardly any air in the stream—I would say there is no air in the stream—and we see the water squirting out from that lower orifice.

Mr. Freeman: In other words, Mr. Aghnides, as you increased the resistance you began to flood the chamber and more water came out?

The Witness: That's right.

Mr. Freeman: And as we decreased the resistance by using only one baffle, or divider, or whatever you want to call it, there was less resistance and less water coming out of the spout?

(Tr. 486:)

The Witness: Yes, sir.

Mr. Freeman: And more aeration?

The Witness: More aeration, but still insufficient aeration.

Mr. Freeman: And we are both now talking about the demonstration of your model that you call the Felten pump; correct?

The Witness: Yes, sir.

Mr. Freeman: Now we found the same to be true with the Spring-Flo, or was it the Velva-Flo, last January; when we put in a plurality of screens, one on top of the other, we had too great resistance and the chamber filled up and water came out of the inlet openings; correct?

The Witness: Yes, we did.

Mr. Freeman: And last January, when we decreased the number of screens so that we had less

resistance, the chamber did not fill up and water did not come out?

The Witness: Yes. Now I shall answer, if I may. Here we have applied the teaching of my patent about proportioning resistance, but, even then, because of the flooding, we could not put the orifice where we wanted it. When the orifice was lower down, then the aeration greatly decreased from what it would be in the upper position. So it is incorrect to say, even when the structure has been modified (Tr. 487:)

in accordance with the teaching of my patent—even then the amount of air going through the device is variable, according to the position of the orifice, whereas that condition does not exist in the aerator.

The Court: We will take our ten-minute recess.

(Brief recess taken.)

Q. (By Mr. Ely:) Now, Mr. Aghnides, do you have any way of demonstrating what will happen to the Felten device if the resistance is increased beyond that shown in the patent?

A. Yes.

Q. All right, will you tell us what you are going to do?

A. Here we have the Felten device made in metal, according to the Felten patent. The parts can be taken out and shown, if the Court desires.

Q. I think you should take them out.

A. At the upstream end of this device, at the inlet end, we have the orifice shown in the Felten patent and below the orifice we have the throat. We have there a pin to keep the space shown in the Felten patent between the orifice and the throat. At the lower part of the device we have the four baskets, as shown in the Felten patent, and that is the full device. We have, of course, the main body containing those parts. I shall put them back now.

(Tr. 488:)

Q. Now will you put that back together again, and then let's take it over and put it on the apparatus and demonstrate it, first, just as you have it there.

Mr. Freeman: Do you have a drawing?

Mr. Ely: Yes, I have a drawing here of this device Mr. Aghnides has just shown to the Court, and I am going to ask that it (the model) be marked (Tr. 489:)
in evidence as Plaintiff's Exhibit No. 56.

(The model referred to was received in evidence as Plaintiff's Exhibit 56.)

Mr. Ely: Then I have a drawing which shows that element 56, with the addition which is going to be put on it, and we will mark the drawing now as 57.

(The drawing referred to was received in evidence as Plaintiff's Exhibit 57.)

Mr. Ely: I think I will change the order of my questions, inasmuch as this drawing has been introduced.

Q. (By Mr. Ely:) What is the part which is shown below this element, Plaintiff's Exhibit 56? It seems that the drawing is divided. The part you have been showing to the Court is in the upper part of the drawing. What is that in the lower part of the drawing?

A. In the lower part of the drawing I have twenty-one screens which will be added to the resistance offered by the baskets.

Q. That is, you have a chamber there which is threaded, so that you can thread it in the bottom of 56—and that will add what?

A. That will add twenty-one screens of the type used in the Velva-Flo aerator made by Firestone.

(Tr. 490:)

Q. The added part you have is right here, is it not (indicating)?

A. That's right.

Q. Do you want to take that part and show it to the Court?

The Court: It can be marked 58, then.

Mr. Hamilton: Could we mark that as 56-A, so we can keep it in the box?

The Court: That will be all right.

(The part referred to was received in evidence as Plaintiff's Exhibit 56-A.)

The Witness: Exhibit 56-A comprises seven units of the Firestone aerator. There are three screens in each of them, which makes in total twenty-one spaced screens. In a previous demonstration last January we had seen that if, in the aerator, you add two or three screens the operation is no more normal; water comes out through the vents, through the orifices intended to suck in air. Here we are keeping the four baskets Felten showed in his patent and we are adding twenty-one screens of the type used in my aerator, to show that Felton has no proportioning of the stream velocity with the elements below necessary to flood the chamber.

Mr. Ely: I am going to mark the part shown on the drawing, Plaintiff's Exhibit 57, with "56" and "56-A."

(Tr. 491:)

Q. (By Mr. Ely:) Now, Mr. Aghnides, will you take 56, which is the pump alone, will you take that over to the apparatus and demonstrate it?

A. Now we have Felton without any addition, with the lateral pipe intended to suck ozone open to the atmosphere. We shall demonstrate the vacuum it is able to create. (Demonstrates model on faucet.) The gauge shows a vacuum of twenty-two and a half inches of mercury.

Now we shall add the resistance offered by twenty-one screens to what it already contains.

Mr. Freeman: Now this is no showing of Felten; this is something that isn't in the prior art; there is no patent that shows it.

Mr. Ely: This is putting 56 and 56-A together.

Mr. Freeman: But there is no prior patent that shows 56-A.

The Witness: This will illustrate that no proportioning is necessary; and we have seen that before when, instead of four baskets, we put only one; and now we have the four baskets in plus twenty-one screens. (Demonstrates model on faucet.)

Q. (By Mr. Ely:) What is your reading?

A. We read on the gauge a vacuum of twenty-three and a half inches, which shows that the addition of twenty-one screens, which is in itself seven times the resistance used in an aerator, it shows that the vacuum is created

(Tr. 492:)

just as well, if not better. In other words, it does not destroy the purpose of the device, neither its function.

Q. Now, with respect to your own aerator, what difference, if any, does it make if you increase the resistance in a manner somewhat similar to what you have done here?

A. Well, we have demonstrated last January that if, in the aerator, we add a couple of screens, for each additional screen we have less air entrained by the device. Then when we put the third screen the chamber is completely flooded, no aeration whatsoever takes place, so the device becomes completely useless.

Q. I wish you would just do that test again right now. What is this, first; this is Plaintiff's Exhibit 42, isn't it, as I recall it?

A. Here we have an aerator built by Firestone. In it we are adding three screens on top of the other normal three screens.

Q. Having six in all then?

A. Having six in all. We are attaching this device to the tap (demonstrating with model on faucet) to show that no aeration takes place any more, that the chamber is flooded and the water squirts out from the orifices which were intended to draw in air. In other words, the aerator has elements which must be proportioned. They were (Tr. 493:)

proportioned before, and a slight disturbance by addition of some resistance disrupts the equilibrium and the aerator is no more an aerator, whereas, in the pumps there is no such teaching, no such necessity; you can put anything that will permit the flooding of the chamber. In fact, as we have seen, the more you flood, the more you add length, the better vacuum you obtain.

* * *

(Tr. 506:)

Q. (By Mr. Ely:) Now, Mr. Aghnides, in testing these various devices, you have, by the glass test, demonstrated, as I understand it, in a way, the difference in the amount of air entrained by vacuum pumps and by aerators made under your patent?

A. Right.

Q. That is more or less a rule-of-thumb way of showing it. Do you have any other way of showing the comparative efficiency of the two types of devices in this respect, the amount of air entrained?

A. Yes. In all these tests where the water was falling in a normal position, the water, that is to say, the stream, was following the law of gravitation and falling down, so we could not see how fast it was running and how much air was in the stream, except, in a very empirical manner, by the glass test.

Now I have a series of tests which are upside down; in other words, the stream goes in the opposite direction from gravitation; it goes skyward. Then we can see how much water comes out, how high the water shoots up when the holes through which air enters are open and when those holes are closed, to show that when the device is operating in a condition to draw in air, if there is a lot of air the original amount of water shoots up very high, and if there is very little amount of air then the change is (Tr. 507:)
very little too.

Here I have a gooseneck which I shall attach to the faucet in the center, and on the other end of this gooseneck, the free end, I shall attach different devices, for making comparisons of the streams with and without air, all other conditions being left equal.

Mr. Freeman: The water going upside down?
The Witness: Yes, the water going upside down.

• • •

(Tr. 508:)

The Witness: We have now a stream of water without air shooting up only one inch and a half. When the air orifice is open the water shoots up two inches and a quarter. So the increase of the volume

of the water in Felten is shown by those two figures, with and without air. We can see how much air there was in and how much swelling of the stream (Tr. 509:)
took place.

Q. Now will you perform the same experiment with your own vacuum pump, Plaintiff's Exhibit No. 47? What is the diameter of the outlet opening in the Aghnides vacuum pump?

A. Three-eighths of an inch discharge opening.

Now I am attaching my own vacuum pump onto the gooseneck (demonstrates.) Here again I closed the orifice provided for the admission of the gas and we had a stream without air six inches high. When I remove my finger and air is admitted, the total height rises from six to six and three-quarter inches, showing that there is very little air in the stream.

Q. Now let's test the metal Felten vacuum pump, which was Plaintiff's Exhibit 56.

A. Here I am holding the metal-made Felten pump, which has an outlet orifice of half an inch. (Demonstrating with model on gooseneck.) Here we have a stream without air of one inch, and, when the air orifice is left open, one and a half to one and three-quarters inches high. This metal-made pump, as we are seeing, produces very comparable results with the plastic pump we just tested, as the figures show.

Q. Let's take the Spring-Flo and tell us what you are going to do with the Spring-Flo in making the same tests, Mr. Aghnides. Take a look at it and see if it's all right, Mr. (Tr. 510:)
Aghnides. I am handing you Plaintiff's Exhibit 29.

A. I am holding a Spring-Flo water aerator, made by Chase Brass and Copper Company, and I find in it all the parts which should be in the device. Then I am going to

attach it on the gooseneck and close the slots, in other words, the openings for the admission of air, with a rubber belt. The inner diameter is five-eighths of an inch. Now the Spring-Flo is attached, with the air holds closed, and we shall have a stream of water without air (demonstrating); one and a half to one and three-quarter inches high, height of water without air. Now I shall take the rubber band off, so as to admit air into the stream. A twelve to twelve and a quarter inch bubbly mushrooming stream.

Q. What was the character of the stream; was it coherent all the way up to where it broke?

A. It was coherent all the way up and it mushroomed into a lot of bubbles and you could see it was a very rich stream in air, because the difference in height with and without air was one and a half to one and three-quarters to twelve to twelve and a quarter.

* * *

(Tr. 511:)

Q. (By Mr. Ely:) The increase in the volume due to the mixture of air, is that reflected in the height of the column?

A. Yes. I don't see any other factor changed. The only factor changed here is the opening or closing of the lateral air slots. All other conditions remain equal. So as soon as the air gets in the water is broken up and the air is entrapped and the additional air raises the height of that

(Tr. 512:)

from about two inches to about twelve inches.

Q. It was really, as a matter of fact, one and a half to one and three-quarters to twelve to twelve and a quarter?

A. That's right. Any errors in one case are repeated in the other; they are all subjected to the same conditions. The only change is opening and closing of air vents, and it shows how much air has been drawn in in each case.

Q. Now this is the model which was Plaintiff's Exhibit No. 28.

A. Here we have a coupling, to be able to attach it to the gooseneck, and below the coupling is Figure 4 as we had produced and demonstrated last January.

Mr. Freeman: That is one screen and an apertured diaphragm?

The Witness: No, sir; two screens.

Mr. Freeman: In other words, the first patent?

The Witness: The first patent.

Q. (By Mr. Ely:) Will you put it on and will you give us the dimensions, please.

A. One-half inch discharge orifice. Here again I have closed the orifices provided for the admission of air with a rubber band, and we shall have a stream of water without air (demonstrating) which is six inches high; and we see that when we open the air vents we obtain thirty-two inches of aerated column of water, when we make this (Tr. 513:)
upside-down test with the aerator corresponding to Figure 4 of the patent.

Q. In that case what kind of column did you get all the way up?

A. We obtained again a bubbly stream all the way up to the top.

Q. Did the bubbles stay in the stream all the way up to where it broke at the top?

A. They do.

Q. Again what was the cause of the increase in height from six inches to thirty-two inches?

A. Again it was because of the inclusion in the water of a tremendous volume of air in the form of bubbles which swelled the stream, which had no other place to go except through the discharge end upwards.

Q. Now I want you to take the Mel-O-Flo aerator and perform the same tests.

A. Here I have a Mel-O-Flo aerator—I am holding it—on top of which I shall place three legs to keep the floating center member in position, because when we shall turn this aerator upside down that floating member which is in the ring with the onion would naturally fall back. For that reason I built a ring with legs to keep that in position when it is in operation.

(Tr. 514:)

Q. Did you give us the dimension of the outlet end?

A. Five-eighths of an inch. Now, as before, I shall put a rubber band around the orifice provided for the admission of air, so that we may obtain a stream without air and measure its height (demonstrating). It is two and a half to three inches high. Now when we open the air vents, the orifices for the admission of air, we have a stream eighteen and a half inches high. Here again we see that the performance is comparable to that of the Spring-Flo aerator in the amount of air added to the stream of water.

Mr. Ely: Is that the Mel-O-Flo that was in evidence before?

Mr. Hamilton: No, it is not; it is the Mel-O-Flo with this additional ring.

Q. (By Mr. Ely:) Mr. Aghnides, is that identical with the Mel-O-Flo which has been previously offered in the case?

A. Yes, all the parts are the same production.

Mr. Ely: I will introduce this particular Mel-O-Flo with the spider to hold the diaphragm in place as Plaintiff's Exhibit 58.

(The model referred to was received in evidence as Plaintiff's Exhibit 58.)

Q. (By Mr. Ely:) Now, Mr. Aghnides, what was the reason why you got such a small increase in volume in the case of the Aghnides vacuum pump and the two Felten
(Tr. 515:)
vacuum pumps as compared with the results you got from the Spring-Flo and the Velva-Flo?

A. Well, the reason is very simple. As I have shown this morning, vacuum pumps have a portion which creates a vacuum, as in my pump and as in Felten's pump, and that portion, which is flooded with water, as we have seen this morning, does not exist in the aerators. Now there is a very important reason for which the difference is so great between the two devices, pumps and aerators. As soon as we once produce vacuum, as we have seen on the gauge, and that vacuum is created at the expense of the greatest part of the energy of the water, naturally there is little energy left for the entrainment of a big volume of air. In the concept of the aerator and the construction of it there is not such a portion—I mean a portion that creates vacuum—it does not exist in the aerators and, as a consequence, the energy of the water is not expended for a purpose which is not desired in an aerator; in other words, it is not expended to create vacuum, because an aerator does not need to create a vacuum.

For these structural reasons and reasons of the law of conservation of energy, if you spend the energy of the water for one purpose, you can't spend it for another; and vacuum pumps, as we have seen, spend it greatly for creating a high degree of vacuum.
(Tr. 516:)

So it is for the first time, with this concept of my aerator, that the whole and total energy of the water pressure has

been made available for one sole purpose, to entrain the greatest amount of air, to divide and mix that air with the water as well as possible, so that you obtain not only a great deal of foam, but a foam of good quality. The foam will be better if the amount of water in respect to the air contained is very small; in other words, if you make out of one inch of one stream eight inches of foam, you will have a real foam, a rich foam; whereas, if you stretch one inch of water into one inch and a half you have so little air in it that, for all practical purposes, the water is not aerated. The mere fact that there are some bubbles in it can not qualify the water as being aerated. Naturally, everybody is free to build one way or the other, but apparently nobody thought to aerate the water, in the pumps to aerate the water, because they had been known for decades; scientists have seen those vacuum pumps for decades.

Mr. Freeman: I object to what scientists have seen.

The Court: Strike that out.

Mr. Ely: I think that is sufficient, Mr. Aghnides.

Q. (By Mr. Ely:) Mr. Aghnides, you were questioned on cross-examination and some reference made to a Solomon patent. I show you a copy of the Solomon British (Tr. 517:)
patent No. 406,316. Are you familiar with that patent?

A. Yes, I am.

Q. Have you any models showing the construction of the Solomon device?

A. I do.

Q. What is this Solomon patent, what was its purpose; do you know?

A. It was intended to aerate beer; and I have not tried

to see if it aerates beer, but I did try to see if it gives a bubbly stream, and I find it does not give any such thing.

Q. How many models of the Solomon patent do you have?

A. I think I have two.

Q. That is, you have a model in accordance with what figures; Figures 2 and 3?

A. One without the valve and one with.

* * *

(Tr. 518:)

Q. (By Mr. Ely:) Go ahead and make your demonstration.

A. (Demonstrating with model on faucet and water running.) Here we have a divergent, splashing, non-coherent stream of water. If we put any object under it (Tr. 519:)
it will splash all over and the stream is a spray-like stream. There are no bubbles in the stream; the stream is divergent, harsh, incoherent and air-free.

Q. Is it comparable with the stream that is obtained from your aerators?

A. No relation whatsoever. Neither the patent ever said it was anything like it, because this beer aerator was made to aerate beer, and beer, under the slightest agitation, produces itself in froth, and if this device was to produce a bubbly stream, as the aerator does, it would have been impossible to draw a single glass of beer; you would have nothing but froth.

Q. Now, Mr. Aghnides, will you take the other model—I understand you have another model of the Solomon device which, I understand, is made in accordance with Figures 7 and 8?

A. Yes, sir.

* * *

(Tr. 520:)

Q. (By Mr. Ely:) Mr. Aghnides, just how does that operate?

A. There is a valve upst eam in which, when the pressure of the beer goes down, it permits the valve to go up; when the pressure of the beer is below a certain degree (Tr. 521:)
that valve is unable to be pushed down, so it goes up and seals the upper orifice of the device so there is no beer going through and there is no drip.

• • •

Q. (By Mr. Ely:) Now will you demonstrate that, Mr. Aghnides, on your tank?

A. (Demonstrating model on faucet with water running.) Here we see, as before, an incoherent, divergent, splashing, bubble-free stream. Now if I open this other faucet, so as to decrease the pressure of the water inside the Solomon device, we shall see the spring-effect operating, (Tr. 522:)
and get immediately no drip or flow of beer.

• • •

(Tr. 523:)

Re-cross Examination by Mr. Freeman:

• • •

(Tr. 581:)

Re-direct Examination by Mr. Ely:

Q. Now, going to the subject of this drawing which Mr. Freeman has just spoken of, Plaintiff's Exhibit 45, have you had made since our adjourning on yesterday a second model of the Felten patent?

A. Yes, sir.

• • •

(Tr. 582:)

The Court: Let's don't go back over what was done yesterday. Tell us what you have done to this differently from what you had yesterday.

The Witness: The one we had yesterday had a slight difference with the one we have today, which, in my opinion, does not produce any different results, but, to satisfy the Court, we had this new one made to look and be exactly the same as the Felten drawing shows. You will see, your Honor, that this lateral pipe, the orifice continues inside and protrudes a little beyond the tubular part below.

* * *

(Tr. 585:)

The Court: In respect to the one that was made yesterday in comparison to the one that has been used heretofore, is there any other significant difference?

The Witness: No. The point was, as Mr. Freeman indicated yesterday, in our model the position of that lateral hole changes somehow or runs so it wasn't in accordance with the patent. Now we have seen what it did and we have the one here which, to our best ability, is exactly what Felten shows, and we will prove to this Court that it didn't make any material difference, as we thought it would not make.

Mr. Ely: I want to introduce in evidence as Plaintiff's next exhibit the model which Mr. Aghnides has produced this morning, as Plaintiff's Exhibit 62.

(The model referred to was received in evidence as Plaintiff's Exhibit 62.)

Q. (By Mr. Ely:) How about the baskets; did you have time to make a new set of baskets?

A. No, we didn't have time to make a new set of baskets, so we shall use the baskets that we used in the model demonstrated yesterday.

Mr. Ely: Will the Court permit us to go through the demonstrations we did with the model, Exhibit 44?

The Court: Yes, go ahead.

(Tr. 597:)

J. W. McGarry, a witness for the plaintiffs, being first duly sworn, testified as follows:

Direct Examination by Mr. Ely:

Q. Please state your name and residence, Mr. McGarry.

A. My name is J. W. McGarry. I live in Waterbury, Connecticut.

Q. What is your present occupation?

A. I am retired, sir.

Q. What was your former occupation?

A. I was General Sales Manager of the Waterbury Manufacturing Division of the Chase Brass & Copper Company.

(Tr. 598:)

Q. How long had you been with the Chase Brass & Copper Company?

A. Forty-four and a half years.

Q. How long had you been connected with the faucet business?

A. About that length of time.

Q. This Spring-Flo device, concerning which there has been considerable testimony in this case—you have been in court, haven't you, during the proceeding?

A. Yes, sir.

Q. Where was that made: where would you make the Spring-Flo?

A. At Waterbury, Connecticut.

Q. And under license from Mr. Aghnides?

A. Under license from Mr. Aghnides, yes, sir.

Q. When was Mr. Aghnides' aerator first called to your attention, and how?

A. It was brought to us in the spring of 1941 in the form of samples and the patents.

Q. Were there any metal aerators in existence at that time, made under the Aghnides patent, that you know of?

A. Yes, the Softflo was made by the Chicago Faucet Company.

Q. Did you examine the Chicago Faucet aerator made under the Aghnides patent at that time?

(Tr. 599:)

A. Yes, sir.

Q. What did you do; what induced you to take the license under the patent?

A. Well, we were interested in the patent first because at that time Chase was constantly striving to improve the flow of water from its faucets, and when this aerator was brought to us by Mr. Aghnides and put under test, we were very much impressed with the stream, because it was the solution of the problem of obtaining an improved stream. We became very enthusiastic about it when we found the improved stream also contained aerated water. We knew then it would be a very welcome device in every American home and would be a very desirable manufacture for the Chase Brass & Copper Company if the patent was found to be valid.

We instituted a patent search and, during the interim, we made numerous samples of aerators embodying constructions which we felt were non-conflicting with the Aghnides construction, for the purpose of seeing what we could develop in comparable performance. We could produce nothing that did compare with the Aghnides performance and, consequently, when the conclusion was that

the patents were valid, we made arrangements with Aghnides to produce and sell the aerator in the United States.

Q. Do you recall how much time elapsed from the time, you say, in 1941, that the Aghnides aerator was called to (Tr. 600:)
your attention in this manner by Mr. Aghnides and the time you took the license?

A. About three years.

Q. You took the license, as I recall, in 1944?

A. 1944, I think the record discloses.

* * *

(Tr. 616:)

Mr. Freeman: If your Honor please, when the deposition was taken we then had a defense of misuse and that was directed toward the defense of misuse. I am not urging it now, but I think the advertisement is still good with respect to being on sale.

Mr. Reddy: Your Honor, with respect to the trademark which was introduced in evidence, I'd like to ask Mr. Freeman if he is relying on that as proof of sale, of a first sale in March, inasmuch as he just agreed with me as to the first sale.

Mr. Freeman: I agreed with you as to the first sale, so far as the records you have, was about May, and I will agree that that is it.

* * *

NORMAN LETTVIN, a witness for the defendant, being first duly sworn, testified as follows:

Cross Examination by Mr. Ely:

(Tr. 725:)

Q. (By Mr. Ely:) Now are you familiar with the routine and procedure in the British Patent Office in handling applications?

A. Only from what my patent experience has been with the British Patent Office.

Q. That is what I asked you. Is it not a fact that during the prosecution of a British application a patent will (Tr. 726:)

be cited and you will be asked to amend your application to make reference to the patent which has been cited by the British Patent Office?

A. Correct; when the patent is considered pertinent.

Q. They will ask you to make a reference in your specification to that patent which has been cited?

A. Correct.

Q. And we now have a somewhat similar practice in the United States Patent Office, where, at the end of the patent, are listed references cited?

A. Correct.

Q. Now the British Patent Office allowed Patent No. 408687 over the Solomon British patent, did they not?

A. Correct.

Q. And I will read you the claim, the first claim, of that patent:

> "A device for intimately mixing air with a liquid flowing under pressure, comprising an injector portion provided upstream of the part where it aspirates air with a perforated cross partition that divides the stream of liquid into a number of small streams . . ."

In other words, that is the diaphragm, is it not?

A. Upstream diaphragm.

Q. (Reading:)

> ". . . and downstream the said part with an atom-
(Tr. 727:)
> izing and mixing portion comprising one or more finely perforated plates . . ."?

A. Correct.

Q. That corresponds to the screen in the American patent and the British patent?

A. Correct.

Q. Then the claim goes on:

> ". . . so that the resulting jet has a substantially uniform pressure throughout its cross section and consists of a uniformly distributed, finely broken mixture of liquid and air having the particles of liquid and air in intimate contact with each other even after issuing from the said device"?

A. Correct.

Q. That describes a coherent stream in which the bubbles are imprisoned as they leave the device, does it not?

A. If you mean by "coherent stream" one where the resulting jet has a substantially uniform pressure throughout its cross-section and consists of a uniformly distributed, finely broken mixture of liquid and air having the particles of liquid and air in intimate contact with each other even after issuing from the said device, if that whole definition is your definition of "coherent stream," then that is true.

* * *

(Tr: 730:)

Q. (By Mr. Ely:) You didn't answer my question. I said that you know—and I will start over again—you know that in the British patent 625,084 there is a reference to the former British patent 468,687.

A. Correct.

Q. And you have said that in the former British patent 468,687 there was a reference to the Solomon patent?

A. Yes, sir.

Q. You will go that far with me, will you?

(Tr. 731:)

A. Yes, sir.

Q. So the examiner had before him, or had knowledge, when he was examining 625,084, of Patent No. 468,687?

Q. We could infer that, but I have no way of knowing it.

Q. And, if he did, he of course knew what was in the text of Patent No. 468,687?

A. He should have read it.

Q. Now they did allow the British patent No. 625,084, did they not?

A. Yes.

Q. And that claim reads as follows:

> "A device for producing a jet of water containing air bubbles, comprising an injector portion which is provided, upstream of the part where it aspirates air, with a perforated cross partition . . ."

Now that is the diaphragm, isn't it?

A. Yes, sir.

Q. (Continuing reading:)

> ". . . and downstream the said part with an atomising and mixing part comprising one or more finely perforated plates, characterised in that the holes in said plate or plates are so small and close together as to divide the air into particles of such size as to form small air bubbles having a tendency to remain in suspension in the jet of liquid, the holes in said plate or plates, or the number of these plates or (Tr. 732:)
> the outlet of the device being such as to force the liquid streamlets issuing from said holes to join together and to form at the outlet a single stream or jet."

You are familiar with that language?

A. Yes.

Q. Now those plates referred to in the claim of this British patent in the downstream part of the device form a resistance, do they not?

A. Yes, they are resistance screens.

Q. And it says that the holes in those plates are so small and close together as to divide the air into particles of such size as to form small air bubbles having a tendency to remain in suspension in the jet of liquid; that's what it says, isn't it?

A. Yes, sir.

Q. And you gather from that that the resistance described in the claim of this second British patent is a resistance which is sufficient to cause the aerated stream of water to be of such character that the bubbles are suspended therein, do you?

A. In the British patent?

Q. Yes, sir.

* * * *

(Tr. 733:)

Q. (By Mr. Ely:) Now let's talk about Solomon a minute. Will you look at the provisional specification of the Solomon patent, the very first page, the first provisional specification, where it says:

> "... each stream being broken upon a point, or end, of the projecting peg, so that turbulent flow is assured."

A. Where do you find that?

Q. Line 36.

A. I can't find that—oh, "In operating the device"—

(Tr. 734:)

I read that now.

Q. Reading:

"In operating the device the liquid passes through the set of holes that are bored right through, each stream being broken upon a point, or end, of the projecting peg . . ."

You read that, do you not?

A. Yes, sir.

Q. Do you find in the first provisional specification any description of anything that reunites the strains after they are broken?

A. Only this statement, beginning in line 45 or 46:

". . . and consequently the liquid and air are thoroughly mixed before emerging from the open end of the device."

Q. That does not say that the streams are reunited?

A. It doesn't use those words.

Q. Also, in the second provisional specification, over on page 2, line 26, it says:

"When a tap provided with the device is opened liquid will flow through the set of passages that extend from end to end of the solid part of the cylinder and will impinge on the transversely disposed pegs of the device causing turbulence of the liquid."

You don't find in there any statement that the liquid is thereafter reunited in a coherent jet, do you? (Tr. 735:)

A. None other than reference being had to the liquid mixing with air.

Q. Now, over on page 3 of the complete specification, beginning line 30, the first column, it says:

"The walls or sides of the lower or hollow part of the cylinder are provided at a suitable distance below

the upper solid part of the cylinder with holes into which are driven pegs of suitable length which converge toward the centre or axis of the cylinder and are transversely disposed with respect to the passages that extend from end to end of the solid part of the cylinder, and serve as a means for breaking up the liquid as it emerges from the lower ends of said passages."

You find that?

A. Yes, sir.

Q. You do not find any description of the broken-up streams?

A. Not at that point; and I just call your attention to a further description on page 4, column 1, which I had read earlier, beginning line 3:

"At the same time air will be drawn through the other set of passages 5 and become mixed with the liquid, thereby aerating same and causing a foam or froth to be formed on the upper part of the liquid when the latter is drawn off into a glass or vessel placed below the device."

(Tr. 736:)

Q. That is the upper part of the liquid when the latter is drawn off in a glass placed below the device?

A. That's correct.

Q. Now let's refer to the Hyatt patent, 326,221, and particularly to Figure 5. Now that patent, as I understand it, is for a device for purifying water for cities or large industrial installations. Is that true?

A. Correct.

Q. It does not deliver an aerated stream of water at the point of use, does it?

A. No, but it delivers an aerated stream of water at the end of the operative device shown.

Q. But, as you see that device, looking at Figure 5, that device in the lower right-hand corner of the figure is a filter, is it not?

A. Correct.

Q. And the water flows into the filter and then into the main?

A. Correct.

Q. So that this device does not deliver a fully aerated stream of water at the point of use, does it?

A. No, sir.

Q. It is, in fact, a water-treatment plant, is it not? (Tr. 737:)

A. In the general use of the term, yes.

Q. There is no proportioning of the resistance to the velocity of the stream so as to produce a coherent jet of water with the bubbles imprisoned therein, is there?

A. I disagree with that.

Q. Wherein do you find anything to that effect?

A. There is nothing stated, but you take those five screens, plus water coming in and air coming in, and I refer you to Figure 3 of the second Aghnides patent, which shows five screens and water coming in above the five screens and air coming in through the side, and, if that delivers an aerated stream, this will deliver an aerated stream.

Q. This delivers a stream which is confined in the pipes, does it not?

A. Yes.

Q. Then there is no jet, in the sense of an open jet, which is filled with bubbles imprisoned therein?

A. You mean from the outlet end of the device?

Q. Yes, sir.

A. There appears to be none.

Q. Now look at the upper (lower) part of Figure 5. There is no device in the end of the pipe D for increasing the velocity of the flow of the water any higher than it is through the balance of the pipe?

(Tr. 738:)

A. Whatever the velocity of the water is in that pipe will be the velocity—

Q. Through the whole distance of the pipe?

A. Yes, sir.

Q. Now let's turn to Ferguson. That Ferguson patent, Figure 1, shows an old-time bathtub, does it not?

A. I guess so.

Q. You perhaps do not remember those old-time bathtubs, but this is a device which is intended to be placed in the end of one of those old-time bathtubs, is it not?

A. As it appears in Fig. 1.

Q. And it hangs over the edge and extends for some distance above the upper edge of the bathtub?

A. Yes.

Q. Then, over at the right we see a cylinder f, do we not?

A. A cylinder f, yes.

Q. That is intended to hold gas under pressure, is it not?

A. I presume so.

Q. You know it is, don't you?

A. Yes, sir.

Q. And that gas under pressure goes through the pipe f, and then into pipe e, shown more fully in Figure 2?

A. I said I presumed that f is under pressure, and you said I know. I can't find it in the specification, but I

(Tr. 739:)

will go along with you; I presume f is under pressure. What was this last question?

Q. And I say the gas is delivered by the pipe e, is it not, that extends inward?

A. It is delivered through the hose f, and then through e, yes, that's correct.

Q. Now the pressure of the gas as it issues from the lower end of pipe e draws the water, or whatever it may be, from the cylinder a, and the two issue inward as a spray, do they not, against the thimble h?

A. You state that the gas draws the water?

Q. Well, the gas from the pipe e will draw the water down through the pipe d, in addition to the force of gravity; is that right?

A. I don't see that at all. In fact, as I recall—I would have to check this, but you see that a', that pipe coming down? I think that is from the water supply of the house. You see the arrow up above that pipe? I think that is from the water supply of the house, and that enters into the chamber and, obviously, if everything is open, the water pressure of the house would push the water through the cylinder a, and then through the pipe b, and through the pipe c into the pipe d, and the water would entrain the gas, rather than the gas entrain the water.

(Tr. 740:)

Now let me point this out: If what you have just asked were true, that the gas drew the water, it would be practically impossible, because let's assume—

Q. I didn't say that, Mr. Lettvin. I said, and you agreed with me, that the gas in the cylinder f was under pressure.

A. Yes, sir.

Q. Now what I said, or, at least, what I intended to say, was that the gas is issuing from the pipe e under pressure and that mingles—

A. It would when the pressure in the cylinder was high, but, as you evacuated the cylinder, the pressure would progressively fall.

Q. If there wasn't any pressure in the cylinder, then there wouldn't be any gas flowing out of the cylinder?

A. Oh, yes, because the water, being under pressure, would affect that chamber, or suck out the gas out of the gas cylinder.

Q. Then that acts as a vacuum pump; is that right?

A. Well, for a while it acts as a mixing device, when the gas is under pressure. As the gas pressure falls and assistance is needed to draw it in, then it acts as an aspirator.

Q. Now the water which is received in the device is (Tr. 741:)
held in this tank a, is it not?

A. It goes into a, and then from a into the pipe d.

Q. And that a, that is where you put the salts, is it not?

A. Correct.

Q. And the salts and the carbon dioxide, which I believe is a gas, mingle together and have some sort of chemical reaction; is that right?

Q. Well, the salts, as I understand it, dissolve in the water and, therefore, it is a solution of salt. When I say "solution," it goes fully in and you have some reaction even with the water, and then, when it goes through, I imagine the salt solution mixes with the gas.

Q. That's correct. Now let's take the Lockwood patent, number 1,195,044. Now that is a device for treating saccharine juices, is it not?

A. Correct.

Q. And the casing which we see in Figure 2 is closed and it has two inlets, one 4 and the other 5?

A. Correct.

Q. And the inlet 4 is for the admission of sulphur dioxide gas?

A. Yes. You said two inlets. You meant gas inlets 4 and 5?

Q. There are two gas inlets; one is 4, which was for (Tr. 742:)
the admission of sulphur dioxide?

A. 4 for the admission of sulphur dioxide, yes.

Q. And the other gas inlet, 5, for the admission of carbon dioxide?

A. Correct.

Q. And the intent is that the sulphur dioxide and the carbon dioxide should react with the raw cane juice for decolorizing or bleaching; is that right?

A. Did you read that? If it's in the "spec", that's what it's for.

Q. Well, read the paragraph beginning at line 16 on page 1.

Q. Yes, sir, I find that.

Q. And over on the second column, line 79:

> "The gases naturally act on the juice during the passage through the down-pipe, and further react on the liquid in the retarder, resulting in some effective clarification and bleaching."

Is that right?

A. That's correct.

Q. Then the saccharine juice and gases are discharged into the pipe 29, are they not?

A. Yes.

Q. Then from the pipe 29 they go down into a long stand-pipe 30?

A. Correct.

(Tr. 743:)

Q. And then go into what is called the retarder, which is 33?

A. Correct.

Q. What is the purpose of having these discharge into the pipe and then into the retarder?

A. If I recall correctly, the purpose was to maintain the gases in contact with the saccharine juices as long as possible, so that you could get sufficient reaction.

Q. Now what is the size of this device?

A. I have no knowledge.

Q. Will you look at Figure 1, please?

A. Yes, sir.

Q. You see on the sidewall a faucet, do you not?

A. Yes.

Q. Now that gives some indication as to the size—

(At this point the hearing was recessed on account of the sudden illness of Mr. Ely, of counsel for the plaintiff.).

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(Tr. 746:)

The trial of the above-entitled matter, having been adjourned on October 13, 1955, was resumed on Tuesday, November 6, 1955, at 10:00 A. M., before Honorable Johnson J. Hayes, United States Judge, in the grand jury room of the United States Post Office and Court House Building, Greensboro, North Carolina.

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(Tr. 747:)

NORMAN LETTVIN, a witness for the defendant, having been previously duly sworn, resumed the stand and testified further as follows:

Cross Examination (cont'd) by Mr. Adams:

Q. At the very end of our previous session, Mr. Lettvin,

(Tr. 748:)

you were being asked about the size of the faucet in the Lockwood patent, or the size of the apparatus, I think it was. You were asked to look at Figure 1 and, in connection with determining the size of the apparatus, you were asked whether on the side wall there was a faucet 42; and then the question which was not answered was, "Now, that gives some indication as to the size", and I ask you that is a fact, is it not?

A. It gives indication of the size of the apparatus in which the type of mixing device of Figure 2 is embodied.

* * *

(Tr. 749:)

Q. (By Mr. Adams:) Now did you stop at all to estimate, if 42 is the faucet, how big this apparatus would be?

A. No. I was merely interested in the principle of a device for bringing in liquid and causing the liquid to break up and using that broken-up liquid in the jets to draw in gases and to mix the gases with the broken-up

(Tr. 750:)

liquid and pass out through a constricted orifice, which I think is shown as 8 in Figure 2, and the principle remains the same, whether it's for a large apparatus or for a small apparatus.

Q. And do you know anything about what results you get with such an apparatus; have you ever tried it?

A. I believe I have seen one tested and it produced a mixture of water and air when the arms 4 and 5, the conduits 4 and 5, were open to the air.

Q. What sort of saccharine juices were put through the one that you tested?

A. I said I saw it tested with water and I said it produced—

Q. How big was that?

A. The device was arranged to be fitted at the end of a faucet.

Q. So it was different than it is in this Lockwood patent?

A. Not at all; it embodied the identical principle.

Q. Different size, different proportions?

A. The same principle.

Q. Did you build it?

A. No. It was built under my supervision and direction.

Q. But this Lockwood device certainly is not designed, (Tr. 751:)
as shown in the patent, to be attached to a faucet, is it?

A. No, sir.

Q. Now would you turn to the Claflin patent. That, I believe, is number 3 in the binder. It is number 881,548. Now, as I understand it—correct me if I am wrong—that is directed to what is called there a vacuum faucet; is that right?

A. I find the words "a liquid supplying faucet" on page—

Q. Now will you look at page 2, column 1, line 58?

A. Yes, the words "vacuum faucet" appear there.

* * *

(Tr. 752:)

Q. (By Mr. Adams:) But, in so far as it operates as a vacuum faucet as distinguished from a water faucet, it is intended to operate in a system which is normally under vacuum; is that right?

A. The particular embodiment was for sucking air from a system which is enclosed.

Q. You mean enclosed in the sense that no air could leak into it?

A. Well, in the ideal case you would have no air leaking in, but if air leaked in, which it most probably did, air would leak in through the system.

Q. In the specification the tank 38 in Figure 6 is referred to as a vacuum tank, is it not—and I direct your attention to page 2, column 1, line 53?

A. Yes, vacuum chamber 38.

Q. It is a well-known type of steam-heating system, known as a vacuum steam heating system, isn't it?

A. Oh, yes, I believe—

Q. And it is intended to operate under vacuum, isn't it?

A. When you say "well-known", I would say that, within this patent, it was designed for a vacuum steam heating system. I don't know what the art was other than that.

Q. You dont know about vacuum steam heating systems?

A. I know that they exist, but I don't know whether

(Tr. 753:)

this was the type of system that it was.

Q. Anyway, normally, the way the system is intended to operate, tank 38 is a vacuum tank and the internal piping of the steam system is intended to be under vacuum all the time; is that not so?

A. In the desirable form, yes.

Q. And the precaution is taken to include what are called check valves 42, which are shown at the upper right-hand side of Figure 6 and lower down on the right-hand side of Figure 6 and again in Figure 1; is that right?

A. Yes.

Q. And those check valves are put there for the purpose of keeping any air from getting into the system; is that right?

A. It is for preventing a back-flow of air into the system when the faucet is turned off.

* * *

(Tr. 757:)

A. I'm not speaking either as a home-owner or maker or seller. I have studied this art and believe that to be the fact.

Q. You have studied it as a patent attorney; isn't that right?

A. That's correct, and as an engineer.

Q. What were you doing as an engineer in this art?

A. Pardon.

Q. What were you doing as an engineer in this so-called water-aerating art?

A. I haven't done anything in the water-aerating art, * * *.

* * *

(Tr. 758:)

Q. (By Mr. Adams:) This specification points out that this vacuum faucet was intended to produce a vacuum as high as 29 inches? I call your attention to page 1, column 1, line 51.

A. That's correct.

Q. That's pretty high vacuum, isn't it?

A. That's correct.

Q. That is, the perfect vacuum would be what; 30 inches?

A. Close to 30 inches.

Q. Now you took up the Battersby patent. That's the British patent which is, I believe, 8 in the binder of patents. It is British patent 323,242. It's illustrated in the drawings, isn't it, as part of a soda fountain?

A. There are some inferences in the specification which could possibly lead to that statement, but I believe that the specification also states that that can be mounted at

(Tr. 759:)

the end of a faucet in a kitchen. May I read? It says it "can be attached to any domestic water tap for household use." That is found on page 3, column 2, lines 113 to 116. But there is the inference, on page 3, column 1, lines 14 to 18, that it could be mounted on a counter, so that might lead you to believe that was for a soda fountain.

Q. You have missed the real reference, which is just above that, page 3, column 1, which actually says that it is in a soda fountain?

A. That's correct.

• • •

(Tr. 760:)

Q. Now will you tell me what there is inside this apparatus which would finely divide the jet which issues from the orifice?

A. I would like to explain to you that what he says here is a little difficult to comprehend—you have to read the entire context of this specification, because he says here that "with the apparatus so far described." Now I believe at that point he hasn't yet disclosed the impingement stem, but in the entire apparatus as shown the impingement stem —I believe it's given the letter "u"—is part of the dividing means. At that point he says "with the apparatus so far described"—and then I am leaving some matters out—that you will get some finely divided water and air mixture which is highly aerated. Now there is some mixing taking place, because that jet, as it leaves the nozzle, starts to spread out a little. The greater portion goes centrally down and impinges on that impingement stem, but a portion of it will strike the inwardly sloping walls. Do you see that conical reduction of the pipe h which is shown in Figure 2. Now he could have meant that even if you left the stem out at that point, when he says "with the apparatus thus far described," he could have meant that the impingement of the water on these inward projections which are formed by that conical reduction could bring about the aeration of the water. That could have been what he meant, but I say, when you take this entire description as a whole, there are impingement surfaces in the conical reduction, there's the impingement surface on the peg u, and the entire device will bring about a—what's the word he used? He uses that the water will be highly aerated when it discharges.

Q. Now, actually, Battersby says nothing about these things you have just been talking about, does he?

A. Pardon.

Q. Does he say anything about impingement on the conical surfaces?

A. No, not about that.

• • •

(Tr. 764:)

Q. (By Mr. Adams:) You think that Battersby is going to give a stream which is anything like the stream you get out of the Aghnides device?

A. I didn't say that.

Q. Well, do you think so?

A. I don't know.

• • •

(Tr. 765:)

Q. What were you doing in 1929 when the Battersby patent issued?

A. What was I doing?

Q. Yes, sir.

(Tr. 766:)

A. Individually?

Q. Yes.

A. I probably was in school.

Q. In grammar school maybe?

A. I think you are right.

Q. And what were you doing when Mr. Aghnides made his invention in 1936? You were in high school probably?

A. Probably; I think I was.

Q. Now let's look at this anti-splash device of Battersby for a minute. What splash does that device prevent?

A. I don't quite follow your question. I will try to answer it. He just says that the lower end of Battersby may be fitted with any form of anti-splash device. He does not show the details of the anti-splash device.

• • •

(Tr. 768:)

Q. (By Mr. Adams:) Certainly you agree that if you

are going to put an anti-splash device on there you are not going to put one on that changes the announced intention of Battersby?

A. No, sir.

Q. Look down there on page 3, line 100, which says:

> "The blending, atomizing and aeration of the liquids is intensified by the jet stream impinging on the walls of the receptacle v"—that is the glass—"or on its contents or both, combined with the violent agitation set up in the receptacle v."

Did you ever see a soda-fountain squirter work?

A. Yes.

Q. And that is a good description of it, isn't it; it squirts down into the glass and stirs that all up into a froth, doesn't it?

A. I have seen that happen.

(Tr. 769:)

Q. You are not going to put an anti-splash device on, that prevents that, are you?

A. But he says an anti-splash device at the lower end.

Q. So you reason about it that it can be any anti-splash device, as a matter of words?

A. That is what he says.

Q. Now the anti-splash devices that he does show is one that is ideally shaped to prevent the very kind of splashing that would result from squirting a jet down into a glass, isn't it?

A. It could be used for that.

* * *

(Tr. 771:)

Q. (By Mr. Adams:) Well, is it still your position, do you want to convey the idea, that the stream coming out

of Battersby is anything like the stream coming out of Aghnides?

A. I didn't say that.

Q. You don't mean to convey that?

A. I didn't say that.

Q. Do you mean to convey that idea?

A. No. I told you what Battersby teaches.

• • •

(Tr. 773:)

Q. (By Mr. Adams:) You know that in this case Mr. Aghnides is talking about putting in sufficient resistance to break up the water, form a bubbly stream and make it coherent; isn't that what we are talking about, about resistance in the path of the jet?

• • •

(Tr. 774:)

A. That's one of the resistances.

Q. Is this peg the kind of thing that will give that kind of resistance?

A. Yes, sir. I should say it this way: It is an impingement body upon which, if jets impinge, you can arrange impingement bodies in such a manner as to achieve that result, any result you want to get.

Q. You came into this art, Mr. Lettvin, long after Mr. Aghnides had taught all this to the public, didn't you?

A. I don't know what you mean by that. I didn't make any investigation before he filed his first application, if that's what you mean.

Q. What investigations, actually, have you made since?

A. I have made investigations which have resulted in the materials I have referred to.

Q. You have gotten the best material together you could find to show that the Aghnides patent was invalid, haven't you?

A. I got the best material together I could find which would show the disclosure of resistance members for breaking up water and air to produce an aerated stream.

Q. You say your knowledge of the water aerator art is as a patent attorney. When did you begin, as a patent attorney, to work in the water aerator art?

(Tr. 775:)

A. In this specific arrangement?

Q. I'm not talking about Battersby; I'm talking about the subject-matter.

A. The first search I ever made in water aerators, I believe, was in 1951.

Q. For the Melard Manufacturing Company, wasn't it?

A. I believe so.

Q. You are their patent counsel?

Q. Yes, sir.

Q. Now, if you will, please consider the Solomon patent. Maybe you don't have to look at the patent itself. That is item 10. In Figures 7 and 8 there is shown a form of the device in which there is a spring-held valve member, and in your testimony, at page 690, I understood you were criticizing the model produced by Mr. Aghnides on the ground that his model had too much spring tension in that valve. Is it your position that the spring tension makes the device inoperative?

A. I don't follow you at all on that.

Q. Well, does it make any difference whether you have more or less spring tension at that point so long as the spring tension is weak enough to let the valve open and let the water come through?

A. It may.

(Tr. 776:)

Q. Now what difference would it make?

A. It's hard to predict.

Q. You don't know?

A. It's hard to predict.

Q. You don't know whether more, or less, or anything about it, really?

A. Well, it would require an extensive analysis.

Q. Now turn to the Felten patent. That is number 6 in the binder. You were here when it was demonstrated that, with the Aghnides aerator, the amount of vacuum that was created, measured by attaching a vacuum gauge to the air-ports, was about one inch, and with the defendant's structure it was no measurable amount, but with Felten there was about twenty-five inches of vacuum produced. Do you recall that?

A. I recall that, yes.

Q. Will you tell me what there was in the Felten device, and not in the Aghnides or defendant's device, that produced this high vacuum?

A. The ratio of the water inlet above the air-entrainment point to the size of the mixing chamber below, because, as I recall, when, in the first test, the mixing chamber below the air inlet was substantially the same size as the air inlet (Tr. 777:)

above—I'm sorry, the water inlet above where the air was entrained; and then, when the second model was brought in, more in conformity with this Felten patent, that is, with a larger mixing chamber where the water and air mixed and passed through, then the vacuum went down; and if that ratio was changed even further, that is, if it was desired to get less vacuum, all one would have to do is merely enlarge that mixing chamber and you would get less vacuum—and that, I think, answers your question.

Q. Now you still haven't answered the question, because I asked you what there is in the Felten patent that produced the vacuum.

A. Well, in the models that you produced, it was the ratio of the inlet water orifice to the mixing chamber and mixing passage where the water and air passed, and that ratio was kept at one to one in the first model and you have got one degree of vacuum, and when it went to one to something else, a little higher, you got less vacuum.

Q. How much less; do you remember?

A. I believe it was a half-inch to an inch of mercury, which represents a four per cent change.

Q. Instead of getting a 25-inch vacuum, we got a (Tr. 778:)
24½-inch vacuum, both of which are very high vacuums and very difficult to attain, aren't they?

A. They are higher vacuums—they are relatively high.

Q. They are very high?

A. I would say relatively high.

Q. Whereas one inch and no inches are insignificant vacuums, aren't they?

A. That is relatively insignificant.

Q. Now I ask you what is it in Felten that produced this difference.

A. I told you.

Q. You say it is a ratio or something?

A. That's correct.

Q. Now do you remember the test where we had the same ratio you are talking about, but the chamber was not flooded, and that we got no vacuum then? A. Yes.

Q. So wouldn't you draw the conclusion that it is due to the flooding of the chamber?

A. No. There was air leaking up through the outlet end, but that is not necessarily the result of flooding of the chamber. That may be an additional result that is obtained, but the purpose of Felten is to mix water and ozone-containing air. It may be an incidental feature that vacuum

(Tr. 779:)
is obtained, or a relatively higher vacuum is obtained, by the structural device shown, but the tests of Mr. Aghnides showed that if you want to get less vacuum all you do is change the ratio of the water-inlet size to the passage below the air inlet. The tests show that just by changing that ratio you can get varying degrees of vacuum, but that isn't the point; the point is that Felten is a water and gas mixing device.

Q. Now isn't it a fact that if that chamber weren't flooded and if the device did not have elements that resulted in flooding that chamber, you wouldn't get the vacuum, would you?

A. That is one of the features that may contribute.

Q. Well, it is a fact, isn't it?

A. That is one of the features that contributes. I said the ratio of the water inlet to the mixing chamber is the other feature.

Q. In other words, you are saying that you can change this chamber of Felten in such a way that you don't have a vacuum device any more?

A. I didn't say that. I don't think you have a vacuum device here. You have a water and ozone-containing air mixing device in Felten.

Q. We demonstrated it was a vacuum device, didn't we?
(Tr. 780:)

A. That happened to be an auxiliary effect.

Q. Doesn't he say that he has to have a vacuum device to work his valve and switch?

A. He utilizes vacuum that is produced by the device, as shown in Fuss, for the actuation of the switch.

Q. Now, doesn't he also say that his suction effect is produced by the conically widening chamber e—and I direct your attention to his own language on page 1 of the specification, line 28, where he refers to "conically widen-

ing chamber e, the widening of which produces in a well known manner the suction of the gas from the perforation d owing to the flow of the liquid from the perforation c into the widened chamber e."

Now isn't he there saying that he has made use of a principle of widening a narrow throat into a wider chamber and filling it with liquid and flowing the liquid through it, which thereby sucks the gas down; isn't that what he's there saying?

A. In a way.

Q. What do you mean by "in a way"? Is he or isn't he?

A. He is using the Venturi Principle to suck in gas, the well-known Venturi Principle.

Q. And that depends upon the fact this is a widened (Tr. 781:)

throat there at the top; it widens and it's full of liquid?

A. That's exactly what the Venturi Tube is.

Q. And that is what he uses?

A. Yes, sir.

* * *

(Tr. 803:)

ELIE P. AGHNIDES, being recalled, testified further as follows:

Direct Examination by Mr. Adams:

(Tr. 804:)

Q. (By Mr. Adams:) Now will you develop for me the circumstances of entering into that license? When did you first come to this country?

A. In 1937, in June; and tried for many months to find a suitable manufacturer to make my aerators under my

patents and, after approaching several firms, I approached the Chicago Faucet Company and, after a few days talking and demonstrating and explaining, we had an agreement (Tr. 805:)
signed on December 2, 1937.

Q. Prior to that time had your devices been manufactured abroad?

A. Rubber-made ones.

Q. Did you bring a sample of that with you?

A. I did.

> Mr. Adams: I have here a device which I would like to have marked for identification, as Plaintiff's Exhibit No. 65. I show it to you, Mr. Aghnides, and ask you whether you can tell me what it is.

A. This is a water aerator made by my French licensees. The French license was granted in 1936, and then I came to this country in 1937 and I brought this with me, and this device contains, this aerator made by my French licensee in 1937, or earlier, contains a restricted orifice, which is obtained by means of a metal tube inserted a little above the diaphragm, which gives the jets of high velocity.

* * *

Q. (By Mr. Adams:) Does that aerator embody the means of both your first patent and your second patent? (Tr. 806:)

A. It did.

Q. Can you, for convenience of the record, read off the labels that appear, or the names that appear, on this aerator. It's so old it's hard to read them.

A. Yes, I have a magnifying glass, which shows it's marked Aghnides License—

Q. Read the actual words at that point, will you? Does it say "Aghnides License"?

A. Yes, it says—will you please read this for me? I'm afraid my eyes are becoming—

> The Court: Let me see if I can read it. I think it says "Licensee" and then the word "Aghnides" and "lice"—I don't know what that means.
>
> The Witness: Yes, "Licence Aghnides", it says.

* * *

(Tr. 810:)

Q. (By Mr. Adams:) I have here, Mr. Aghnides, a blueprint which is entitled at its head "OXY-JET" and then has certain disclosures. Will you tell me what that is?

A. This is the cross-section—

Q. What is the piece of paper?

A. This is a blueprint which I sent to my licensee in 1936, covered with my signature and covered with the date of November 21, 1936.

> (Tr. 811:)
>
> The Court: It's a blueprint giving a cross-section of the device covered by this license agreement you are talking about now?
>
> The Witness: Exactly, your Honor.
>
> Mr. Adams: May I offer this as Exhibit 67?
>
> (The blueprint referred to was received in evidence as Plaintiff's Exhibit 67.)
>
> The Witness: Now this blueprint shows a cross-section of the "OXY-JET" made under license by this French firm, and in this cross-section we clearly see a restricted orifice, which is created by the restriction, a metal tube bearing number 3.

Q. (By Mr. Adams:) What is that item, number 3?

A. A metal tube, I said, number 3, which is effecting a restriction of the orifice above the diaphragm. This is the diaphragm, number 4, and the tube, number 3, is a restriction added there.

Q. Is that also shown as a separate part in a separate box on the drawing?

A. Yes, the dimensions of that metal tube are given in a separate box. The box bears also number 3, to identify the reference number 3 of the cross-section.

Q. I notice that in ink this blueprint bears the inscription "Bruxelles, le 21/11/36," and then what appears to (Tr. 812:)
be a signature. Can you tell me what that is?

A. That is my signature, "Aghnides."

The Court: What is this over here?

The Witness: Brussels. "Bruxelles" is the French way of saying Brussels. Then we have the date, which indicates the 21st of November, 1936.

Q. Were you then living in Brussels?

A. Yes.

Q. Did you put the inscription on there?

A. Yes.

Q. When?

A. At the time I sent it to them. The date shows when I sent it to them.

Q. In other words, you put it on there November the 21st of 1936?

A. Exactly; and this is my signature, "Aghnides" (spelling).

* * *

(Tr. 813:)

Q. (By Mr. Adams:) I want to ask you, if this is a blueprint you sent to your licensee, how does it come to be in your possession?

A. Well, I wrote a letter to them and asked if they had the drawing showing the inner parts of the aerator they built under my license, and they were kind enough to send it to me.

Q. I show you a carbon copy of a letter dated October 21, 1955. Can you tell me what that is?

A. This is the French copy of the letter I sent to this firm, the French licensee, requesting them to send me any documents they have referring to the aerator they built under license.

Q. And attached to it is the translation?

A. Yes.

Q. Now I show you a letter on the letterhead of Pierre P. Zecchini, the French company, dated 7 November, 1955, and ask you to tell me what that is.

A. This is their reply, telling that they are sending this document they found and some other documents.

The Court: Have you got the English translation on the back of it?

The Witness: Yes, here we have the English translation.

(Tr. 814:)

Mr. Adams: May I offer these two letters as Exhibits 68 and 68-A, for one, and 69 and 69-A for the other?

• • •

(Tr. 815:)

Q. (By Mr. Adams:) You stated, Mr. Aghnides, that when you came to this country in 1937 you brought with you this particular Oxy-Jet, Exhibit 65?

A. I did.

Q. Does that contain the same subject-matter as this blueprint, Exhibit 67?

A. It did.

Q. And did you disclose this aerator to the Chicago Faucet Company in connection with your negotiations for the license?

A. Yes, I did.

Q. With whom did you deal?

A. I dealt with Mr. Brown, Senior, who was president of the company.

Q. Is he now living?

A. No, he died a few years ago.

Q. Will you tell me something about your disclosure of this to Mr. Brown? Had he been in the aerator business previously?

(Tr. 816:)

A. No, he had not.

Q. Was this something new to him?

A. That's right. He was interested in it.

Q. What did you do with him to explain it to him and explain its structure?

A. Well, I had to explain to him how it functioned and which are the parts, because he had to know, first, what it does, in order to be interested, and, second, he had to know what it takes to build it. So I took apart the aerator, this one, and I had also a metal-made one, and I took that apart and demonstrated both and gave him all the information about the principle and the structure and the results. That is how he got interested.

Q. Where did you do this with Mr. Brown?

A. In his office there. There was a faucet in the office of Mr. Brown and I did it there, my demonstration.

Q. After you consummated your license with Mr. Brown in December, did you work with Mr. Brown on the design of your aerator?

A. Yes, because they had to comply with the requirement of the agreement, which is that the aerator must be approved by me, must be according to my drawings and it must be approved by me.

Q. What did you do in working with Mr. Brown on the
(Tr. 817:)
design?

A. Well, it was agreed, since we had agreed in the license—

Q. I have here Exhibit 9, which is the license to Chicago Faucet Company, Defendant's Exhibit 9—

Mr. Freeman: Those are the ones we offered and then withdrew them, and we are now presenting photostats.

Q. (Continuing) I find in his agreement, paragraph 4, the following:

"The device will be manufactured according to your plans or after the approval of plans submitted by us. It will not be modified without comm. agreement."

Is that the provision to which you just referred?

A. That's right.

Q. Did you work with him on various plans for designing it one way or another?

A. Yes. I supplied to them all the information concerning aerators, because it was agreed in the contract, and subsequently they complied to the letter with the agreement, and they sent me a sample for approval when they thought it was one dimension, or whatever they thought would fit exactly the faucet they wanted it to fit.

* * *

(Tr. 819:)

Q. (By Mr. Adams:) Now this license agreement, Exhibit 9, also states in paragraph 3, on page 2: "We will send you duplicates of all data or documents relative to

(Tr. 820:)
the advertising, manufacture or sale of faucets with this device." I think something was said in the Chicago depositions about having sent you an advance copy of an advertisement, which was then marked as Defendant's Exhibit 19. Was that sent to you and did you receive it?

A. Yes. The company complied with the contract faithfully.

Q. And did you write the letter which was then marked Exhibit 34, acknowledging it?

A. Yes.

Q. Now you said that the company eventually sent you a sample of what they were going to manufacture. Did you have any correspondence with them in order to get them to send that to you?

A. Yes, I had correspondence.

Q. I show you letters dated December 28, 1937; January 26, 1938; February 14, 1938; March 23, 1938; March 31, 1938; April 14, 1938; and April 30, 1938, and ask you to identify them and tell me what they have to do with this matter of furnishing you with samples.

A. Yes, on December 28, 1937, I was writing to the Chicago Faucet Company—I wrote to them stating—

The Court: The letter is the best evidence of
(Tr. 821:)
what you wrote.

The Witness: Yes, the last paragraph.

The Court: Read the last paragraph.

The Witness: (Reading.)

"I am anxious to be kept posted with the development of the license you have taken and to receive a faucet embodying the device as you intend manufacturing, so that I may transmit my suggestions, in our mutual interest."

Now in the letter I sent to Chicago Faucet Company on January 26, 1938, page 2, I stated:

"I should be very glad to receive your definite sample as, owing to my long experience, I can immediately tell you if the result obtained is perfect or it can be improved."

Then in this letter which is dated February 14, 1938—apparently it is a mistake; it must have been March 14th, because I am acknowledging letters from the Chicago Faucet Company dated February 17th, so this letter I am referring to is dated February 14th, but apparently should be March 14, 1938.

Mr. Freeman: We can agree to that, your Honor.

The Court: That's perfectly obvious.

The Witness: In the last paragraph I said:

"I am looking forward to receive your 'softflo' faucet which I hope will really be revolutionary."

(Tr. 822:)

The Court: The stamped receipt of it by the Chicago Faucet shows March 22, 1938.

The Witness: Then in the following letter from the Chicago Faucet Company to me, dated March 23, 1938, it is stated:

"With reference to the sample, will it be satisfactory if we send you simply the Softflo spout attachment or do you want a complete faucet?"

So I still didn't have it. In the following letter, dated March 31, 1938, I stated:

"With regard to my return to the United States, I shall be equally pleased to see you again and I shall proceed to your nice country as soon as I shall have organized the principal European markets. This is

one of the reasons for which I am impatient to receive your samples and those of my other licencees."

Mr. Freeman: Would you read the P.S. on that letter?

The Witness: Yes, the postscript:

"Please oblige sending me a copy of the magazine in which your Softflo ad has been issued."

Then in the following letter from the Chicago Faucet Company to me, dated April 14, 1938, it is stated:

"We note that you desire a complete faucet with the Softflo attachment. We are, therefore, pleased to send this to you. In case you wish to put this on for (Tr. 823:)
demonstrating purposes, we are sending you our No. 332 Wall Faucet for cold water only, as we believe you will be able to install this more readily and more generally than a double sink faucet."

In the letter from me to the Chicago Faucet Company, dated April 30, 1938, I stated:

"I am looking forward with interest to receive the faucet you kindly sent me and for which I thank you."

The Court: He's read the parts he's interested in. Is there any use putting those letters in; do you see any use offering them as exhibits? You may do so, or, by mutual consent—

Mr. Freeman: That's all right.

Mr. Adams: I'd just as leave put them in as one exhibit. Does the other side concede—

Mr. Freeman: He's read all I'm interested in.

Mr. Adams: There is one other thing I'd like to have on that same subject. Mr. Freeman might

stipulate. This is a document taken from the records of the Chicago Faucet Company—

Mr. Freeman: I have no objection to any of their documents.

* * *

(Tr. 825:)

AFTERNOON SESSION

Mr. Adams: There is one matter on the preceding examination I would like to clear up, because during the noon recess I glanced at this deposition of Mr. Aghnides that Mr. Freeman put in, on pages 50 and 51—

The Court: He introduced the entire deposition. He only read certain parts.

Mr. Adams: Yes; and on those pages it seems to me he referred to some models that were not put in evidence and it makes the deposition a little unclear not to know what was being talked about; and at that point, as I understand it, they were talking about models made by another licensee, the Acushnet Company, and the question was was the device that they made substantially in accordance with Plaintiff's Exhibit 14 of the Chicago lawsuit.

Mr. Aghnides said: "Is that what you are holding in your hand?" The question was "Yes," and the answer was "No, the first ones were slightly different. The second patent, which is restricted orifice, was not incorporated . . ."

ELIE P. AGHNIDES, resumed the stand and testified further as follows:

Direct Examination (Cont'd) by Mr. Adams:

Q. I have here two devices which I had better hand you (Tr. 826:)
at the same time and let you explain what they are and what relation they have to that testimony I just read.

A. The one I am holding now in my hand, which is brownish or beige colored—

Mr. Adams: Maybe we'd better mark it right now, so we will have a number for it. It is Plaintiff's Exhibit 72; and the other one, which is the red-and-black one, I offer as Exhibit 73.

(The two models referred to were received in evidence as Plaintiff's Exhibit 72 and 73.)

The Witness: Exhibit 72 is the first type aerator made by the Acushnet Process Company. Now when I signed an agreement with them in the fall of 1937 I supplied all the information and left them a sample of my French-made Oxy-Jet aerator, which name was carried on on this aerator. Now if we compare the French-made aerator and this we shall see that the design—

Q. The French-made aerator being Exhibit 65?

A. Yes, Exhibit 65 and Exhibit 72 are the same design, only the American-made is smaller so that it would leave more space below the aerator in the sink. Now when Acushnet made this aerator of Exhibit 72 the question of putting that metal ring was considered, and the extra expense—

(Tr. 827:)

Mr. Freeman: I object to his testimony as to what was considered by the Aeushnet people.

The Court: If he participated in it he can tell it.

Mr. Freeman: If he tells us who did the talking. He says it was considered.

The Witness: Yes, between us, the President, Mr. Phillip Young.

Q. (By Mr. Adams:) Did you participate in it? What do you know about it personally?

A. Yes, we discussed, and he said he wanted to make it smaller, a much smaller aerator.

Mr. Freeman: As to what was said, we object.

The Court: Is that part of the discussion between you and him as to what was to be done?

The Witness: Yes.

The Court: I think it's competent. I will give you an exception.

The Witness: He said he had two reasons for asking me not to insist for not putting in a metal ring, as was the case in the French-made Oxy-Jet, and those reasons were, one, the extra cost; and, two, it would shorten the connecting part, which was already a little shortened in connection with the French aerators. Then, later on, when I devised a way of making a small inlet orifice, according to

(Tr. 828:)

my second patent, as shown in Exhibit 73, and which did not require a metal ring, the company at that time incorporated in the new models they made the teaching of the second patent, the restricted orifice.

The Court: That's got Aghnides Patent 2,071,780 on it.

The Witness: It may refer to the tap connector, I don't know, the rubber part, the connector part.

The Court: I want to get straightened out on this patent 2,071,780. We haven't had that number, have we?

Mr. Freeman: That is not involved in this suit.

Mr. Adams: Not involved here; and this, as I understand it, was made before the patents in suit issued.

The Court: The bottom part refers to a patent in Canada in 1936.

The Witness: Yes, they asked me if they could export some, and the patent requirements in Canada required markings, and they were allowed to do that.

Q. (By Mr. Adams:) In this second form of the Acushnet device, Exhibit 73, what is the restricted orifice made of?

A. It is made out of rubber molded simultaneously when the whole connecting part was being made, so that there was no extra expense, and it did not take much space, because it is only three millimeters high.

(Tr. 829:)

Q. Did that accomplish the same thing as the metal insert in the French device, Exhibit 65?

A. It did. That restriction prevented—

Q. Can you see that restricted orifice any better by taking the device apart than by looking down from the top of it?

A. You can see better from the top, in this respect, that you can see it has been purposely restricted. From the other end you can see only the restriction. If you would like I will take it off.

The Court: It's not necessary.

Mr. Adams: Now, your Honor, I would like to demonstrate the Battersby device which the other side have talked about in their case, and I would like to ask Mr. Aghnides to proceed to the demonstration tank and produce a model of the Battersby patent, if he has it.

The Court: Battersby is number 8, isn't it?

Mr. Adams: I would like to offer that model and have it marked Plaintiff's Exhibit 74.

* * *

(Tr. 830:)

Mr. Adams: Also, while this is being attached, I would like to offer an enlarged photostat of the Battersby drawing, which, I understand, is a two-times enlargement.

The Witness: Two-times enlargement of the book drawing.

The Court: What number are you going to give that?

Mr. Adams: Seventy-five.

(The photostat referred to was received in evidence as Plaintiff's Exhibit 75.)

The Witness: Now I have built the Battersby device twice the size of Figure 2, in other words, four times the size of Figure 1, because I measured the glass below to see the proportions of the device, and, the glasses used in soda fountains being about a little more than four times bigger than the glass shown, I built this model for demonstration of the Battersby patent four times bigger than Figure 1; and another reason is that, by increasing the dimensions to the ones specified, it just fitted the spout end of a faucet adapted to receive aerators.

Now the Battersby device has a provision of a small orifice, which gives a very sharp stream. That (Tr. 831:)
orifice is specified as m in the patent. Battersby states in his patent that the water going through that orifice is subdivided in that orifice m, and he considers that a subdivided stream is an aerated stream, as stated in his patent. Now below the orifice m we have a screw which can be screwed inward or outward, and Battersby calls that screw as a flow adjuster—

Q. Labeled "u" in the drawing?

A. Yes—as a flow adjuster, and he states that when another liquid is entering the device through the lateral pipe o, then the flow of the blending liquid will be adjusted and the very sharp jet will penetrate it and break it up. As I understand it, this flow adjuster is provided by Battersby to slow down the flow of the blending liquid so that the sharp jet from the orifice m penetrates it and breaks it up. Now Battersby also states that he has at the foot of the device a special shape, which is to prevent splashing. He says that the outlet end of his device is so shaped as to prevent the splashing, and the drawing in the patent Figure 1 shows that the umbrella-like attachment covers the greatest part of the opening of the glass.

Q. Labeled "t"?

(Tr. 832:)

A. Yes. Now Battersby states that the water going through the orifice m, which he calls the aerated jet, is further aerated when that jet strikes the bottom of a glass or the sidewalls of a glass and creates a violent agitation or turbulence. He refers to the orifice m and says in which the water is subdivided into an aerated jet.

Now, if we demonstrate this device, we shall find out how it performs. (Demonstrates with device on faucet and water running.) Now, as one can clearly see, we have an incoherent, harsh stream of water containing no bubbles whatsoever. Even when the screw is screwed on as tight as it will go, so that it presents the maximum resistance, even at that point the stream issuing is a very harsh, splashing stream and which creates bubbles on the surface of the water drawn into a glass, but it is a harsh, divergent stream.

Now it is very interesting to see that only a fraction of the energy of the water has been used in the device, because we practically find most of the energy of the water in the issuing stream, because the stream issuing from Battersby is even harsher than the ordinary stream from a faucet.

So Battersby has a certain purpose, very clearly described in his patent. He wants to create a very sharp (Tr. 833:)
jet, and he effects some aeration in the bottom of a glass of that sharp jet, which he considers aerated water.

Now we have a mode of operation entirely different in this device because, as one can see, the jet from the orifice m breaks before getting out and we find it in a broken-up state without having undergone that operation which my device performs and which is imprisoning the air into the mass of the water. It's an entirely different situation here, where particles, or strips, or layers of water are surrounded by air, whereas, in a bubbly stream, bubbles are surrounded by water. It's entirely the reverse, reverse process, and we can clearly compare these two streams, the bubbly stream and the Battersby stream, so that there is nothing in between them.

Q. Will you state what you have done? You have mounted—

A. I have mounted on the next faucet, nearest to the one where we were demonstrating Battersby, a Velvet-Flo aerator, so that one can see—

The Court: What is the exhibit number of that Velva-Flo?

Mr. Hamilton: This isn't an exhibit.

The Court: It's like one, though, isn't it?

Mr. Hamilton: Yes, sir, it is exactly the same (Tr. 834:)
thing. It's Exhibit No. 31.

The Witness: (Demonstrating with the two devices.) Now we can see on the one side, where the areator is, we have a white, coherent, non-splash stream, and if one looks at the stream with a flashlight one can see the bubbles in suspension in that jet. Now on the other side we have the Battersby, which is clearly incoherent; the water is all broken up and the air is surrounding particles of water, or strips of water, or layers of water, and, as a result, all the energy of the water, most of the energy of the water, is still in the issuing stream and produces a high degree of splashing. This is like the Solomon device where we have—

The Court: In speaking of "this," what are you talking about?

The Witness: This is Battersby. This Battersby device has a stream inside which strikes a member, which is called the screw u in this case, which is comparable to the pegs used by Solomon, and likewise we have a highly splashing stream here, as we have shown with Solomon, and likewise, as Solomon himself states, when such a stream is projected into a glass the upper portion of the glass will have bubbles formed, but those bubbles are

formed by the violent agitation created by the issuing stream.
(Tr. 835:)

Now, fundamentally, this is very different from the aerator, where we have spent the energy of the water so that there is very little energy left to promote splashing, so no splashing takes place; and the second reason for which the bubbly stream doesn't splash is that in this new way of making a non-splash stream these bubbles cushion the impact. There is such a great amount of bubbles in the mass of the water that when that bubbly stream strikes an object it does not splash because, first of all, it does not have the jet velocity coming out of Battersby or Solomon, and, second, it doesn't splash because of the energy being transformed into bubbles and those bubbles cushion the impact. But the result, independently from my explanation, the result is there, a soft, bubbly stream; the bubbles are in the mass of water. The other is a harsh stream of water surrounded here and there by free air, which immediately spreads, and we don't have the benefit of softening the impact as we do with the bubbles.

Q. Now let me ask you this: In the Battersby patent, page 3, column 2, line 78, he speaks of a jet of aerated water from the nozzle m. Now what do you understand is meant by aerated water in that sense?

A. Well, as I understand it, Battersby aerates the water
(Tr. 836:)
by dividing it; in other words, by issuing it in the form of a thin jet and exposing it to the air in a long, long stem here, so that that jet coming out of the orifice m in Battersby really divides the mass of water into a thin,

sharp stream and only the air which fills the chamber in Battersby comes in contact with that thin stream of water, and you may say that water is to some extent exposed to air. And then he continues and says that this aeration of the bubbly stream—of the sharp jet—is made when that sharp jet strikes into the bottom or the walls of a glass to create a violent agitation.

Q. Let me ask you this: On the same page, column 1, line 51, it says "if this jet is received in a receptacle, the water would be highly aerated and would remain aerated for an appreciable time." Would you tell us what that means?

A. Well, precisely when the jet strikes the glass and produces all those bubbles, you have some aeration taking place, because, when the jet strikes the walls of the glass and the water which is in it, it creates a violent agitation, as Battersby himself explains, and that further aerates the stream, the jet coming from the orifice m, which, in his opinion, was aerated.

Now, in order to produce the effect that the sharp (Tr. 837:)

jet may strike the walls of the glass and create a violent agitation is the reason for which Battersby has selected a new form or shape of a non-splash arrangement. He put a skirt around the foot of the outlet of the device, so that he may maintain the velocity of his sharp jet issuing from the orifice m, because he's relying on that velocity to aerate the water that's drawn in the glass.

Now we have shown that when the screw is entirely in, so we have the maximum resistance, when we still have a highly splashing, incoherent stream, as apparently Battersby intended to use the screw in connection with flavoring liquid so that the sharp jet will break up the flavoring liquid, and it seems that when he intends to use it without any flavoring liquid, then the screw wouldn't have too

much of a function, but even if he wanted to use that screw—of course, it's there—we have shown that he doesn't get anything like the stream issuing from my device.

Mr. Adams: Now, your Honor, I would like to make just one more demonstration.

The Court: Do you care to ask him anything about that?

Mr. Freeman: Yes, sir, I do.

The Court: Before he takes it off, let him conduct (Tr. 838:)
his cross-examination. While he's got the device attached, defense counsel will be permitted to cross examine the witness with respect to this demonstration.

Mr. Freeman: Mr. Aghnides, what do you understand when the patentee, Battersby, states that the adjuster, when desired, may be moved outward or across the entire pipe h, so that the liquid stream will impinge upon the stem, which is causing the blended liquids to be discharged from the pipe h in a foaming state?

The Witness: I understand exactly what he says. In other words, when you put through a blending liquid and the jet strikes that blending liquid, not the pipe or screw, as you all know, syrupy liquid naturally will create a foam and froth and issue as two liquids, the blended liquids and some air and foam and froth.

Mr. Freeman: What do you understand when the patentee says that when plain drinking water is aerated the visible air bubbles soon disappear, although if aerated water is examined under a powerful lens the air is seen in suspension for some time afterwards?

The Witness: I shall tell you exactly what I understand, because it seems clear to me— (Witness demonstrates device on faucet.)

* * *

(Tr. 839:)

The Witness: Now when I draw aerated water, as Mr. Freeman asked me how I understand it, how those bubbles are formed, those bubbles are formed on the top of the glass by the violence of the stream hitting the glass.

Mr. Freeman: Is it your position that no air emits from the device with the water?

The Witness: No, not at all, but that air is not imprisoned in the mass of the water.

Mr. Freeman: Does air pass out of the discharge end of the Battersby device with the water?

The Witness: I would think it does.

Mr. Freeman: And in a mixed form, due to the impingement of the stream against the screw u, the screw which is lettered "u"?

The Witness: Well, we have seen to which degree that stream is mixed, and whatever I would say wouldn't change the situation. That mixture, so far from being coherent, was incoherent, harsh and violent.

Mr. Freeman: I am talking about plain drinking

(Tr. 840:)

water.

The Court: Go on with your demonstration about the plain drinking water.

The Witness: Yes, sir. (Demonstrating) Now these bubbles go away, and if we look with a magnifying glass in the water we can still see some tiny air—I think we can, your Honor, if you would like to look.

The Court: Let me have the glass.

The Witness: Maybe you can see the tiny little bubbles—that's what he's referring to—with the magnifying glass, in the drawn water.

Mr. Freeman: Now, Mr. Aghnides, you use the words "form of anti-splash device" to mean the single form shown in the Battersby patent; correct?

The Witness: Yes, because he specified the shape. He referred to the type of anti-splash he is using as being of a shape to prevent the splashing from the glass upwards, and then he states further that that form of anti-splash device he described could be of any form of anti-splash device, which clearly refers to the same concept of anti-splash, because otherwise the whole function of his device would be destroyed. He described that he must hit the bottom of the glass, he must create bubbles on the top of the glass, he must leave some minute particles (Tr. 841:)

of bubbles you can see with a magnifying glass. You can't do all those things if you change the operation of the device from the one that Battersby intended to have.

* * *

(Tr. 851:)

Q. (By Mr. Adams:) Is there anything said in this Vielliard patent about using the right number of screens or proportioning to secure a coherent aerated stream?

A. No. He shows no air inlets in the device.

* * *

(Tr. 853:)

Mr. Adams: I have here a copy of the Haisman patent, another British patent, 7,005, of 1913. I would like to have that marked.

The Court: Is that patent discussed in the Circuit Court's opinion?

Mr. Adams: I believe not, Your Honor.

The Court: What exhibit number will it take?

Mr. Adams: Number 76, I believe.

(The patent referred to was received in evidence as Plaintiff's Exhibit 76.)

Mr. Adams: At the same time we could mark the model of the Haisman patent, which the witness has produced, as 77. I may say, Your Honor, this patent was in the record in the Chicago case.

(The model referred to was received in evidence as Plaintiff's Exhibit 77.)

Q. (By Mr. Adams:) Would you, Mr. Aghnides, please explain the various parts of this model? First state is this made in accordance with the Haisman patent and the patent drawings.

A. It is. This device comprises a partition with six holes, six orifices, which deliver streamlets of high velocity. Downstream that partition there are openings.

Q. Is that the partition which in the patent is labeled 3? (Tr. 854:)

A. Yes—

Q. The partition is 2 and the holes are 3?

A. And the holes are 3.

The Witness: Downstream that partition, on the wall of the chamber there are orifices, shown by numeral 10, and in the path of the streamlets issuing from the partition there is a wire-mesh screen.

The Court: Numeral what?

The Witness: A wire-mesh screen, shown by numeral 6. In other words, we have here something like a diaphragm, orifices leading inside the chamber, and below those orifices we have a screen, which seems to look like an aerator. Now if we attach this on the faucet and operate it, we shall see the fundamental difference. (Witness demonstrates with device on faucet.) This device gives a divergent spray which is very harsh, which has no
(Tr. 855:)
bubbles. The water is surrounded by air, but there is no air in the mass of water; and Haisman has shown in his patent different screens, finer and coarser. I should like to show that, with any of the screens shown in the patent, the device operates and functions the same. (Witness demonstrates.) This is the third dimension given.

Q. You are now putting a third screen in in place of the second screen?

A. Yes. This is also an equally splashing, divergent stream.

Q. Now let me ask you did you demonstrate this device in the patent office?

A. Yes, I did.

(Tr. 856:)

Q. You referred a moment ago, I believe, to the possibility of showing that an ordinary anti-splash device which would operate satisfactorily on an ordinary stream of water would not necessarily operate properly on a divergent jet stream. Can you use this device to demonstrate that?

A. Yes. If we put on this screen of Haisman, one additional screen, so we have two screens, and attach it to Haisman, we still have a harsh, divergent, splashing

stream. Haisman states that this device should be operated under pressure of 40 pounds, but even at 30 we have a divergent, incoherent, splashing stream. Now if we take this unit which contains the two screens, which was unable to make coherent and non-splash the Haisman stream, and if we attach this unit with the two screens on a splashing faucet—

Q. Before you do that, would you explain what you have on the faucet to permit this attachment?

A. I have a connector, permitting the water of the faucet to go through the orifice of the connector, so that when we shall turn the water on and open this faucet where the connector is we shall see that we have a highly splashing ordinary stream.

(Tr. 857:)

Q. Will you first show the plain water coming out of the faucet?

A. (Demonstrating as requested.) Now here we have a greyish ordinary stream, which is a highly splashing stream.

Q. Does it look whitish?

A. It looks greyish, whitish, anything you wish, because the water is dispersed, highly splashing. If we attach the two screens, which weren't enough to make a coherent stream out of Haisman and eliminate splashing, we shall find that here, because we have no air, we have no stream accelerator in the faucet, the conditions being entirely different, we shall see that a non-splash device has been created which is good for the ordinary faucet, but which is not good for the jet from Haisman. (Witness demonstrates.)

Now here we have a perfectly non-splash stream created by those two screens, and yet, as we saw before that stream of the faucet without any attachment, it was a highly splashing stream. In other words, what is a

non-splash device for a faucet is not necessarily a non-splash device for an aerated stream of water; and whereas a non-splash device on a faucet does not change the mode of operation and the character of the stream except to elimi-
(Tr. 858:)
nate splashing, such as an addition, if it was proportioned according to my patent, would change the mode of operation and the results of those so-called aerators into an entirely new thing, which is being debated here, my aerator, but you may see from this simple test that it is not enough to just take one or two screens and put in a harsh jet or stream and make it non-splash; you have to proportion it.

Q. Is that same thing true if you were trying to convert Battersby into a coherent stream? A. Yes.

Q. And is it also true of Solomon? A. Yes, the same principle. You may put too much resistance, you may put too little resistance, and if you put just enough resistance, according to the principles of my invention, then in that case you are using the teachings of my patent in combining two existing patents to create the result produced by my invention.

Q. What is the fact; would it alter the mode of operation of Solomon if you were to add the proper number of screens to make a coherent, bubbly stream? A. Definitely.

* * *

(Tr. 864:)

Q. (By Mr. Freeman:) Do you recall when you were adversely examined that you said that the device with a restricted orifice wasn't made in Europe until about 1938?
(Tr. 865:)

A. I said I believed, I didn't remember exactly, and I had to go into all these papers—
(Tr. 866:)

Q. (By Mr. Freeman:) Now I call your attention to the

(Tr. 867:)
top of page 51, where you explained that the first ones were slightly different—and I am now quoting:

> "The second patent, which is restricted orifice, was not incorporated, and this connecting part, which is a different invention of mine, was also made in a different way."

Now did you intend by that to say that the restricted orifice was not then in use in the United States?

A. Well, as I say there, the first ones—of Acushnet I mean—were slightly different. Here we have Exhibit 72, which does not have the restricted orifice, and I say

> "which is restricted orifice, was not incorporated, and this connecting part, which is a different invention of mine, was also made in a different way."

What am I asked?

* * *

DEPOSITION OF EARLE E. BROWN

(Dep. Tr. 3:)

EARL E. BROWN, called as a witness by the defendant, having been first duly sworn, testified as follows:

* * *

(Dep. Tr. 26:)

Cross Examination by Mr. Hamilton:

Q. Now, when you made the adapter which is colored green in this drawing with the screen at the top and then you attached to it an aerator at the bottom, what was the

purpose of the screen in the top of the adapter in the combination of adapter and aerator?

A. I don't feel qualified to answer that, because I am not sure that I know. May I say that in the development (Dep. Tr. 27:)

of the aerator Mr. Aghnides came up with ideas, and my father, who was an expert mechanic, went out in the shop and worked them out, and it was a cut and dry deal. They would make it that way, and, well, that is not quite enough aeration, or it has a tendency to splash, or something, and then he would do it over again and make a change, and kept on making changes until finally Mr. Aghnides was satisfied with the result.

* * *

(Dep. Tr. 31:)

Cross Examination by Mr. Reddy:

Q. Mr. Brown, referring to Exhibit 19, the ad which you placed in Domestic Engineering, dated March, 1938, could you tell me whether or not your company made any sales of Softflo aerators prior to the insertion of that ad?

A. No, I could not be certain.

Q. Do you have any recollection at all?

A. No, I am sorry, I don't. We may have made an occasional sale to somebody that we were able to show the device to; but I don't suppose until we gave it publicity that we were able to sell very many.

Q. Do you have any independent recollection of how long after that ad was inserted that any sales, actual sales, were made by Chicago Faucet of the Softflo aerator?

A. Well, I think the sales started very slowly; in fact, I am sure of that, but we began to have sales in a small way, I should say, from that time on.

Mr. Freeman: March, 1938?
The Witness: Yes, sir.

By Mr. Reddy:

Q. As soon as the ad appeared?
(Dep. Tr. 32:)
A. Well, I should say so.
Q. You don't have any records with respect to that?
A. We have an informal type of record which Mr. Ganey kept. He is quite a man for detail and statistics, and he kept that information, and that is the only record that I know of that could be referred to.
Q. Then Mr. Ganey would be the best source of that information?
A. Yes, he would.

Mr. Reddy: That is all.

* * *

(Dep. Tr. 34:)

Re-cross Examination by Mr. Reddy:

Q. Referring to Exhibit 26, I note the first entry is dated January 19th, and further along on the page under "debit" is the sum $83. Now, that represents royalties due Aghnides, is that true?
A. Yes, sir.
Q. Does it represent royalties that were actually paid to him at that time?
A. I am not a bookkeeper, much less an accountant, but I should say that it represents royalties that accrued to him. Undoubtedly other records might be available that would show payments. I notice under this column "Folio, V. R.," which might mean voucher record, and various numbers listed.

Q. Under your arrangement with Mr. Aghnides, were you required to pay him a minimum royalty?

A. Yes.

(Dep. Tr. 35:)

Q. Does this figure represent that minimum royalty?

A. It does, Mr. Reddy, down to this point. I mean, that minimum royalty was to be $1,000 a year, and that figured out $83, and I guess some odd cents, per month.

Q. So that the figure 83 opposite the respective dates merely indicates your payments of minimum royalty and does not refer to royalties paid by reason of actual sales of the aerator?

A. That is correct.

Q. In other words, if you did not sell any aerators in January, you would still have paid Mr. Aghnides $83?

A. That is right.

Q. So that these royalty payments do not evidence sales of the aerators?

A. That is correct.

* * *

(Dep. Tr. 59:)

DEPOSITION OF HENRY A. THEED

HENRY A. THEED thereupon resumed the stand and testified further as follows:

Cross Examination by Mr. Hamilton:

* * *

(Dep. Tr. 62):

Q. (By Mr. Hamilton:) Now, what was the function of that screen in the adapter, the original adapter?

A. Well, in my opinion, it was there as a strainer.

Q. Did it have any effect on the operation of the aerator below?

A. I don't think any appreciable effect, no.

Q. When you changed from the present form with one diaphragm labeled 1-125 and added another diaphragm (Dep. Tr. 63:)
or disc 1-129, you kept the same screen up at the top of the areator. Did you keep it for the same purpose?

A. To the best of my knowledge, yes.

* * *

(Dep. Tr. 66:)

DEPOSITION OF DENIS P. GANEY

Re-direct Examination by Mr. Freeman:

Q. Do you recall about when the company, Chicago Faucet Company, first began to offer for sale Softflo aerators?

A. No.

Q. You have no independent recollection as to that?

A. No.

Q. Were they offered for sale at or about the time of the appearance of the ad that you have in your hand, Defendant's Exhibit 19?

A. I couldn't say.

Q. Now, as sales manager, can you tell me whether or not it was the custom of the company to advertise products for sale prior to the time that they had the products ready for sale?

A. The answer to that would be that we no doubt had it in such form that we would be able to fill orders shortly.

Q. So when the ads appeared of the kind that you have in your hand, Defendant's Exhibit 19, the company then had products on hand for filling orders received as a result of the advertisements, is that correct?

Deposition of Denis P. Ganey.

(Dep. Tr. 67:)

A. Possibly not finished product.

* * *

(Dep. Tr. 67:)

Q. (By Mr. Freeman:) Well, do you have any records of the actual sales, records that maybe you personally kept with respect to the sales of Softflo aerators?

A. I have only one record, which is in the book there of sales by items,—items which go back many years.

Q. Now, will you examine that record and tell us when, in accordance with the records that you have, which I understand is one of your personal records, first sales of Softflo aerators were made?

A. This is not a personal record.

Q. A record kept by you personally, then.

A. In part kept by me personally.

(Dep. Tr. 68:)

Q. Will you tell us when was the first sale or record of sale that you have?

A. The year 1938 records. We show No. 800 sales in May, 1938. The No. 800 was the designation for the Softflo with adapter.

Q. And I understand that in that month there were actually twenty units sold. A. That is recorded.

Q. In other words, you don't know whether those were sold on May 1st, May 10th or May 20th? A. No.

* * *

DEPOSITION OF ALFRED F. STRANG

(Dep. Tr. 84:)

ALFRED F. STRANG was called as a witness by the defendant, and having been first duly sworn, testified as follows:

Direct Examination by Mr. Freeman:

* * *

(Dep. Tr. 92:)

Q. (By Mr. Freeman:) Now, do you know who made the part No. 121, which is the adapter?

A. Well, that was made in our shop. We make parts like that out of brass rod.

Q. How about the making of the body part, 120?

A. The same thing.

Q. So that with the parts that were received or purchased from outside sources, that is, parts 122, 126, 123, 124 and 125, along with those parts that were made by your company, to-wit, part 1-121 and part 1-120, that made up the aerator and adapter, is that correct?

A. Yes, sir, that is correct.

Q. Do you have any recollection of seeing any adapter and aerator in an assembled condition very much as illustrated in Defendants' Exhibit 27; I mean, in an assembled

(Dep. Tr. 93:)

unit, including these parts that were brought into your plant some time in February of 1938?

A. I can't say that I remember them at this time, no. I remember seeing lots of them, but I wouldn't say that was at that time. I don't remember that.

Plaintiff's Exhibit 64.

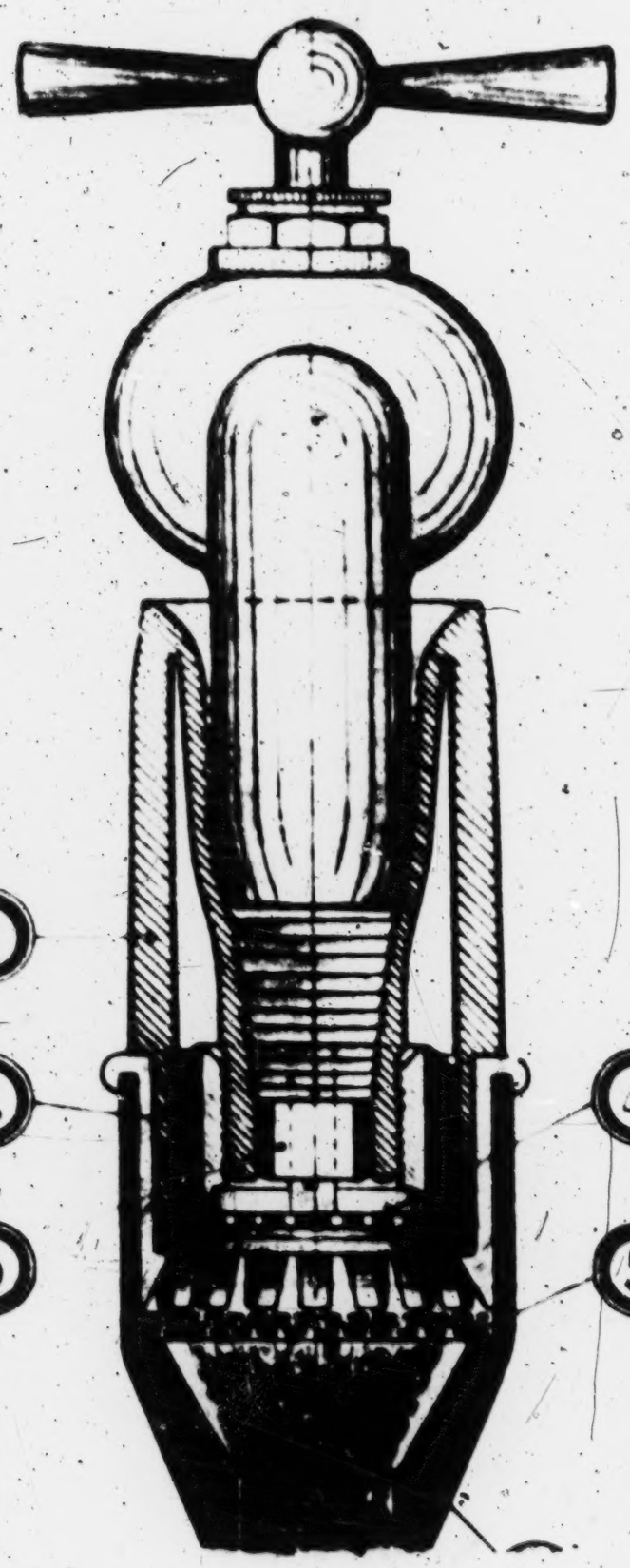
(See opposite ☞)

ITEM		JAN	FEB	MAR	APR	MAY	JUN	SEMI	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
403															
404	7	73	2	22	6	8	55		35	43	6	18	17	3	288
408	7	1		2	2	1									11
409	2														
422	7	8	6	2	13	1	2	32	1		1		3	1	39
423	6									1					1
424	7														
425	12						3								3
426	12														
427	1	2					1								3
428		2	4								1				2
429	1					1			3						4
430	7	1	1	1	2		1						1	1	14
431	6			1		1								1	3
432	6														
434	6														
435	4						1				1				2
436	3														
438	2														
439	6			1	1	2			4	1			2		9
442	17	67	35	66	107	30	91		35	35	53	33	43	20	717
443	7			4	1	2	1		1	3	4	1	1	1	21
444	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
446	12	1		2	1	1					1				
447		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		257	[illegible]	426	253	[illegible]	169	[illegible]
448	17						2						7	1	10
452	7														
454	6														

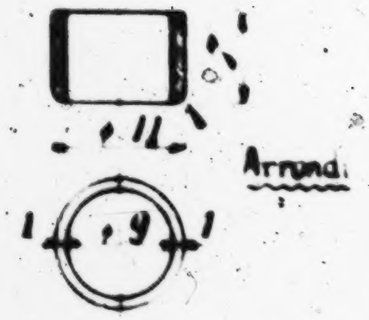
ITEM	JAN	FEB	MAR	APR	MAY	JUN	SEMI	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
783						1								1
784						1								1
793	2					44								46
797	7				1	103		3	19	44	40	41	104	361
795										44		3	23	
800					20	61		102	26	65	26	51	25	449
801												4		4

OXY-JET

VITALISEUR D'EAU



③



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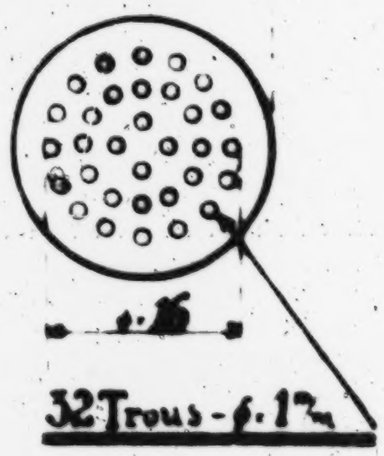
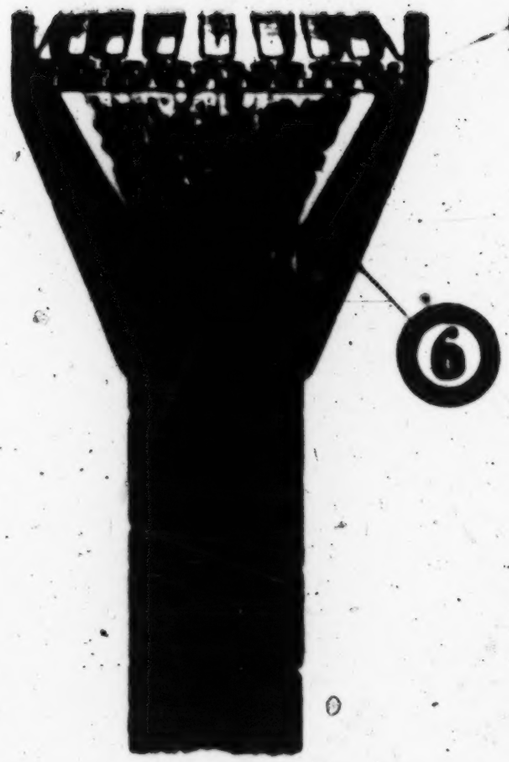


32 Trous - ø 1,2



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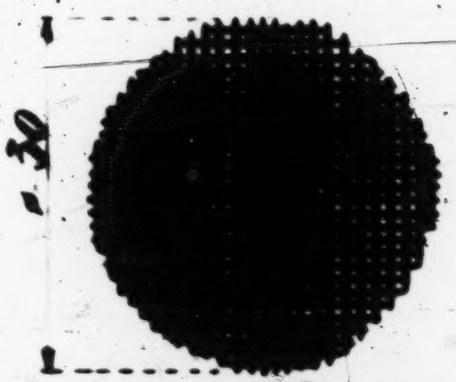
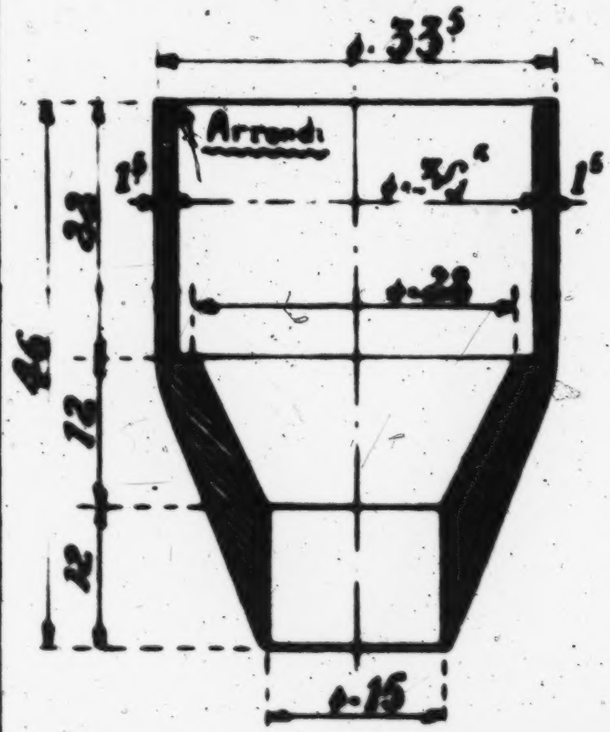


3 Tamis { Ep 0,5 m/m
Carré de 1 m/m

⑥



Dimensions en m/m
Echelle 1/1

E.P. AGHNIDES
14 Bd de Waterloo
Tel. 11.38.00

THE CHICAGO FAUCET CO.

2700 TO 2722 N. CRAWFORD AVENUE
TELEPHONE BELMONT 0301
CHICAGO

ORIGINAL INVOICE

Pl. 71

TERMS:

Net Cash 30 Days, 2 Per Cent 10 Days

SETTLEMENT MAY BE MADE BY ANY CHECK
PAYABLE AT PAR
through Federal Reserve System

Freight allowance only as per our current price list.

Prices subject to change without notice.

Claims for shortage or defective material must be made within 15 days from date of invoice. Return packing slip with such claims.

4 14 8
DATE ENT'D | WANTED | PROMISED | ORDER No. | SHIPPED | WT. APR 1 4 1928

SOLD TO

E.P. AGHNIDES
14 BOULEVARD DE WATERLOO
BRUSSELS, BELGIUM

SHIPPED TO

SAVE

ROUTE
SPL. MARK P.P.
Customer's Order No. ZONE

ROUTE
SPL. MARK
Customer's Order No. ZONE

SALESMAN

12M 3-38 1381 Coated Bond R.P.

DESCRIPTION	PLATE NO.	ITEM NO	QUANTITY	LIST	GROSS AMOUNT	NET AMOUNT
CHROMIUM PLATED SINGLE WALL FAUCET WF SOFTFLO SPOUT END 4 5/8" LONG		332 800 CP			N/C	

IMPORTANT
NO STATEMENT WILL BE RENDERED THE FIRST OF EACH MONTH AS HERETOFORE. KEEP THIS INVOICE AND PAY IT ON THE DUE DATE.

Plaintiff's Exhibit 67.

(See opposite ☞)

Plaintiff's Exhibit 71.

(See opposite ☞)

800

NAME & DESCRIPTION OF PART

800 SOFTFLO ASSEMBLY

NATURE OF CHANGE

Add 1 disc 1-129
1 gasket 1-130
1 screen 1-124
1 separator ring 1-126

REASON FOR CHANGE

To improve stream

ESTIMATED COST OF CHANGE

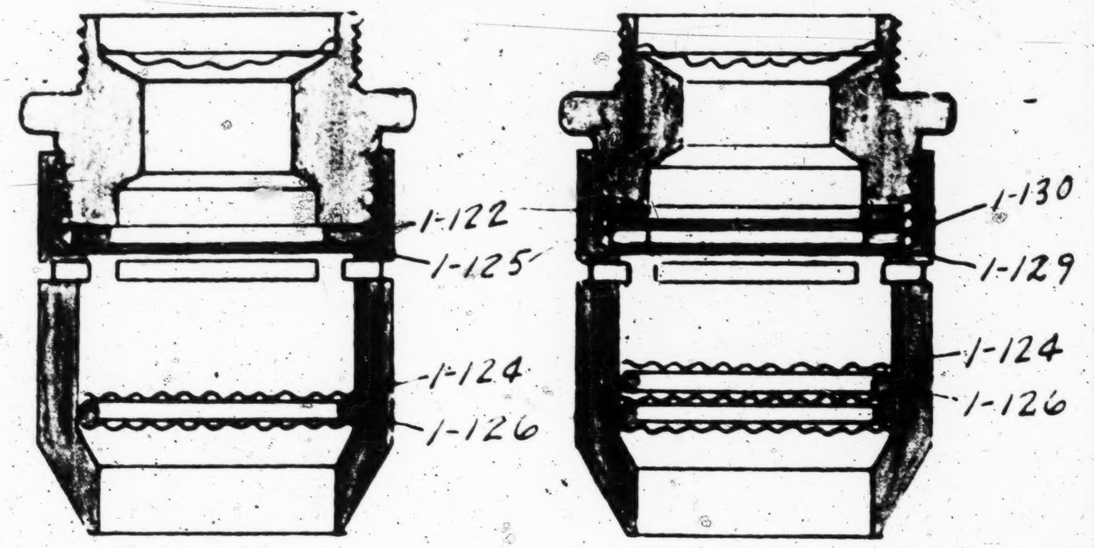
SEE C.O. 1-121-K

OTHER PARTS AFFECTED

1-121 See Change order

REMARKS -

CHANGE ORDER NO. 1
DATE 2-5-40
OLD PART NO. 800
OLD DRAWING NO. 800-A
NEW PART NO.
NEW DRAWING NO.
QUANTITY OF OLD PARTS ON HAND
EFFECTIVE DATE OF CHANGE



PRESENT PROPOSED

SCALE 2" = 1"

SUGGESTED BY H. Steen APPROVED BY ACB

DRAWINGS CHANGED BY H.A.T. MATERIAL SHEETS BY

Defendant's Exhibit 25

THE CHICAGO FAUCET COMPANY
2700 TO 2722 NORTH CRAWFORD AVENUE
CHICAGO

NAME & DESCRIPTION OF PART

Softflo Adapter

CHANGE ORDER NO. 2
DATE 10-27-47
OLD PART NO. 1-121
OLD DRAWING NO. 1291
NEW PART NO.
NEW DRAWING NO. A-1-121
QUANTITY OF OLD PARTS ON HAND
EFFECTIVE DATE OF CHANGE At once

NATURE OF CHANGE Discontinue use of screen #1-123 in adapter and eliminate counter bores of 1/2" dia. and .593 dia. aNd 3/8 dia. bore and use a single bore thru part of 17/32 dia.

REASON FOR CHANGE

Simplify and economize

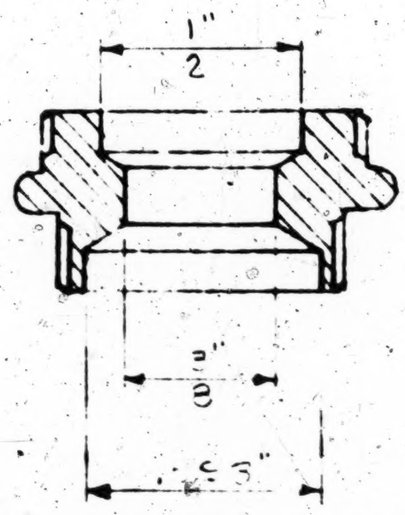
ESTIMATED COST OF CHANGE

No cost involved

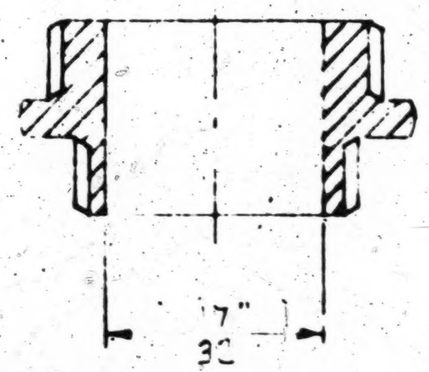
OTHER PARTS AFFECTED

None

REMARKS -



PRESENT



PROPOSED

SUGGESTED BY _____ APPROVED BY

DRAWINGS CHANGED BY F.J.B & H.T. MATERIAL SHEETS BY H. Theed

THE CHICAGO FAUCET COMPANY
2700 TO 2722 NORTH CRAWFORD AVENUE
CHICAGO

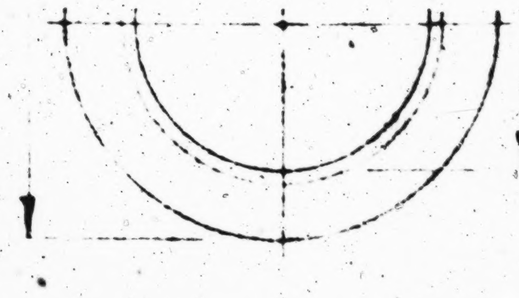
Defendant's Exhibit 30

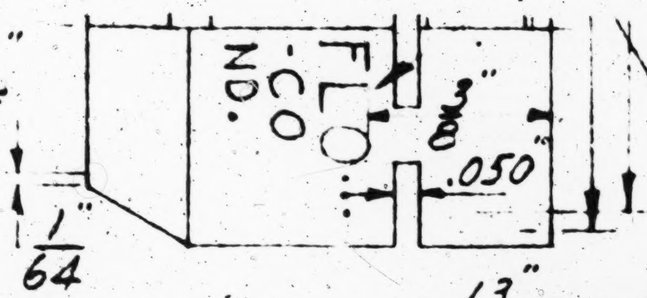
Defendant's Exhibit 25.

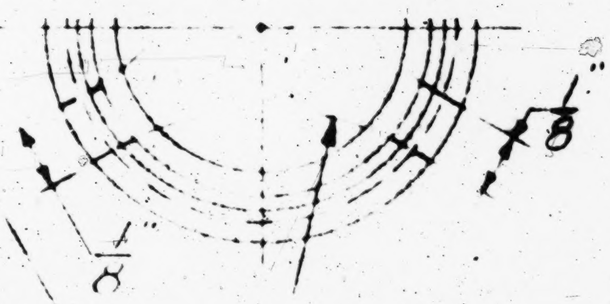
(See opposite ☞)

Defendant's Exhibit 30.

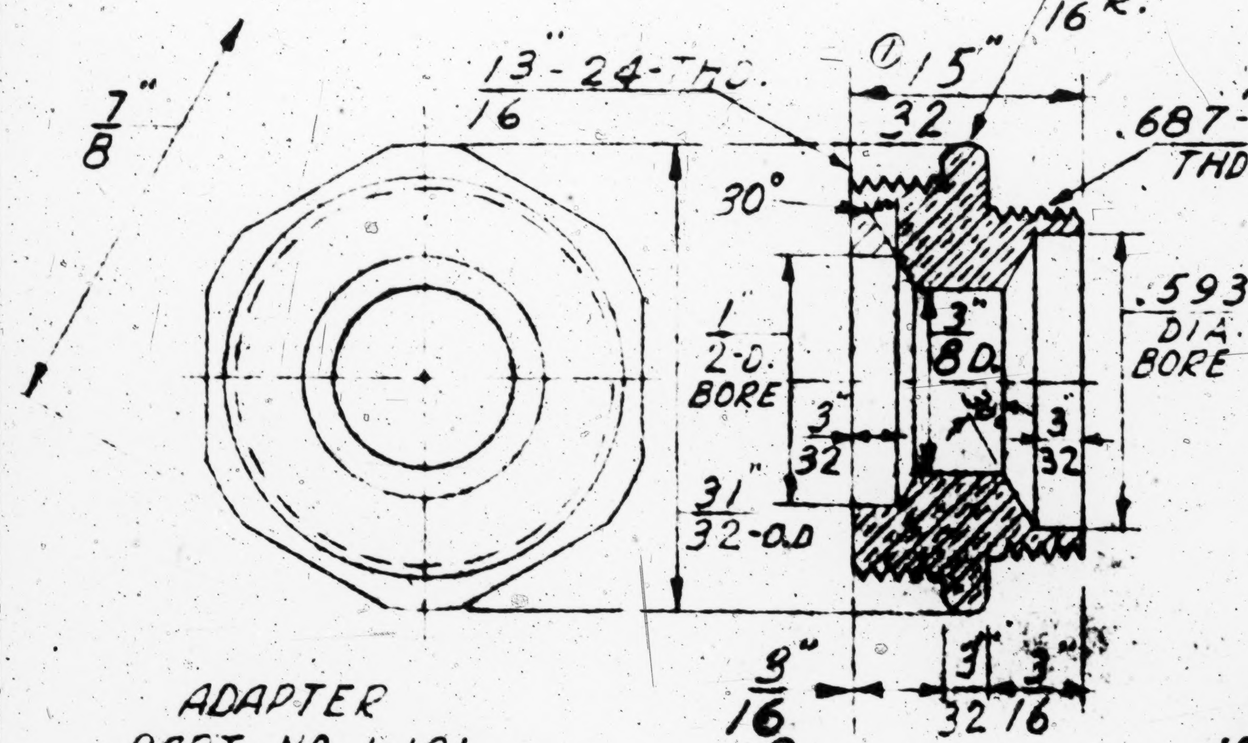
(See opposite ☞)







SCALE 2 TIMES SIZE

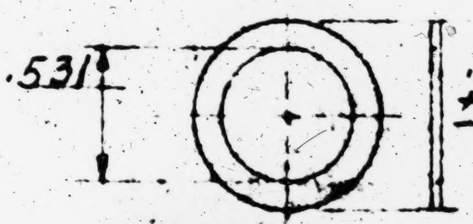


ADAPTER
PART Nº 1-121
MAT. 7/8" HEX. BR. ROD

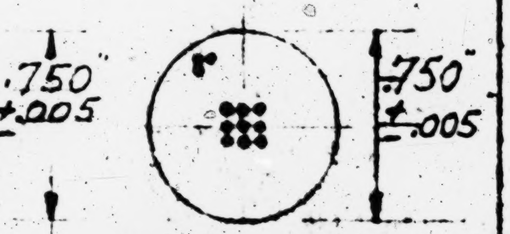
PART # 1-123

PART # 1-124

#28 STD. MESH BRASS SCREENS



GASKET
PART # 1-122
JOHNS MANSVILLE
SERVICE SHEET
1/32" THICK



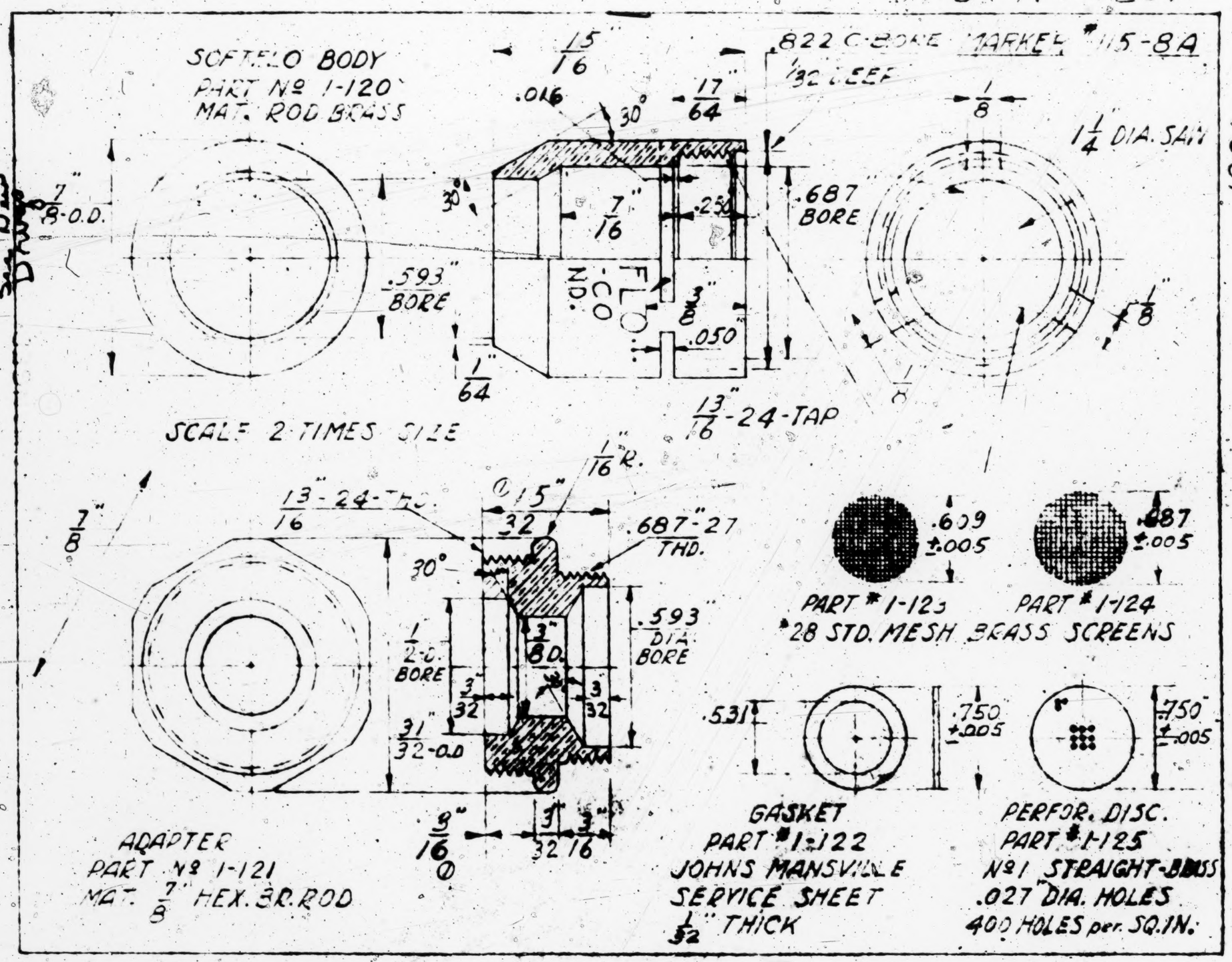
PERFOR. DISC.
PART # 1-125
Nº 1 STRAIGHT-BORE
.027" DIA. HOLES
400 HOLES per SQ. IN.

THE CHICAGO FAUCET CO. CHECKED BY: H. STEEN DRG. Nº 1291

1-28-38 - H.A.T.
① RE-ISSUE 6-13-39 H.A.T. # 1-120
① RE-ISSUE 2-12-40 MAT # 1-121

Ex. 31

DRG. No. 1291



1291

6-26-50

THE CHICAGO FAUCET CO. CHECKED BY: H. STEEN DRG. No 1291

1-28-38 - H.A.T.

(1) RE-ISSUE 6-13-39 H.A.T. #1-120

(1) RE-ISSUE 2-12-40 HAT #1-121

Defendant's Exhibit 31.

(See opposite ☞)

Defendant's Exhibit 32.

(See opposite ☞)

P. 195

Defendant's Exhibit 32

SOURCES OF SUPPLY	TERMS	F O B
+		—

SOURCES OF SUPPLY	TERMS	F O B
Johns-Manville Illinois Coal Spring Co.		

ON ORDER				RECEIPTS							RECEIPTS					
ORDER NUMBER	DATE	VENDOR	QUANTITY	VOUCHER	INVOICE DATE	VENDOR	QUANTITY	UNIT PRICE	INVOICE AMT.		VOUCHER	INVOICE DATE	VENDOR	QUANTITY	UNIT PRICE	INVOICE AMT.
1-177		JMCo	1000	300		1-125	10 20 38	Quadriga	1040	9.50 M	9.81		1-122	J.M.Co.	10M	2.95 M 29.50
1-176		ICSCo	1375	471.10		1-126	11 12 38	ICSCo.	2200		5.25		1-122	J.M.Co.	10M	" 29.50
8-123	8-15-38 Quadriga		1020	8.00 M	8.16		1-124	2-9-39	Quadriga	2100	6.00 M	12.60		1-125	Quadriga	10,900	5.25 M 57.23
1-124	"		1070	"	8.56		1-122	5-26-39	J.M.Co.	10M	2.95 M	29.50	10/9	1-124	"	10100	4.00 M 40.40
1-125			1020	9.50 M	9.69		1-124	5-31-39	Quadriga	10200	4.00 M	40.80	10/21	1-126	ICSCo	1100	2.40 M 2.64
1-122	J.M.Co.		2000	3.00 M	6.50		1-125	"	"	10300	5.25 M	54.08	10/25	"	"	9350	2.40 M 22.44
1-124	Quadriga		2200	6.00 M	13.29		1-126	6-21-39	ICSCo.	12500	2.40 M	30.00	10/31	1-122	J.M.Co.	20M	2.95 M 59.00
1-123	10-3-38 Quadriga		700	6.50 M	4.55		1-125	8-22-39	Quadriga	10M	5.00 M	52.50	11/2	1-125	Quadriga	10200	5.25 M 53.55
1-123	10-3-38 Quadriga		1400	6.50 M	9.10		1-124	"	"	10200	4.00 M	40.80	11/3	1-124	"	10600	4.00 M 42.40

1-177 #70 Service Wt 3400 x 17/32 (both +.003" or -.003") x 1/12" th K 1-103. 31/64" x 1" Smooth P.W.O.W. Wire Cloth Pieces Xind 11-1xd 11-1xd Smooth P.W.O.W. Wire Cloth Pieces Xind 11-1xd 11-1xd

Formed 1x31 1x31 (1-1xd 1-1xd)

(1-1xd 1-1xd diameters from Shop Log, Weight Variance Helen [illegible]

1-177 - H

FILED
SEP 27 1957
JOHN T. FEY, Clerk

IN THE

Supreme Court of the United States

OCTOBER TERM, 1957.

No. 508

S. H. KRESS & COMPANY,
Petitioner,

vs.

ELIE P. AGHNIDES AND CHASE BRASS & COPPER CO., INC.,
Respondents.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FOURTH CIRCUIT.

WILL FREEMAN,
NORMAN LETTVIN,
D. D. ALLEGRETTI,
135 S. La Salle Street,
Chicago 3, Illinois,
Attorneys for Petitioner.

THE BUNTHORP-WARREN PRINTING COMPANY, CHICAGO

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CITATIONS.

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IN THE

Supreme Court of the United States

OCTOBER TERM, 1957.

No. .....

S. H. KRESS & COMPANY,

Petitioner,

vs.

ELIE P. AGHNIDES AND CHASE BRASS & COPPER CO., INC.,

Respondents.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FOURTH CIRCUIT.

Your Petitioner, S. H. Kress & Company, prays that a writ of certiorari issue to review the judgment of the Court of Appeals for the Fourth Circuit, entered in the above entitled case on May 17, 1957.

OPINIONS BELOW

The Opinion of the District Court (1 App. 93-104)* is reported at 140 F. Supp. 582. The Opinion of the Court of Appeals of the Fourth Circuit, reported at ..... F. 2d ....., is printed in Appendix A hereto, *infra*, pages i to xiv. The Court of Appeals' Supplementary Opinion on Motions for

* "1 App. . . ." and "2 App. . . ." refer respectively to the portion of the Trial Record printed in Volume 1 and Volume 2 of Appellant's (Kress') Appendix before the Court of Appeals of the Fourth Circuit.

Rehearing is printed in Appendix A, *infra*, pages xv to xviii.

The prior Opinion of the Court of Appeals of the Seventh Circuit, with which the Opinion of the Court of Appeals of the Fourth Circuit is in direct conflict, is *Aghnides* v. *Goodrie et al.*, 210 F. 2d 859, certiorari denied 348 U. S. 826[1], and is printed in Appendix B hereto, *infra*, pages xix to xxv.

The validity of the patent here involved,[2] was adjudicated in an uncontested case in the District Court for the Middle District of North Carolina, Greensboro Division, in the Fourth Circuit, in *Aghnides* v. *The Meyer's Company*, 117 F. Supp. 839, 99 U. S. P. Q. 488, and 99 U. S. P. Q. 335. No appeal was taken.[1]

The validity of the subject patent was also adjudicated by summary judgment in the District Court for the Northern District of Illinois in *Aghnides* v. *Holden et al.*, 104 U. S. P. Q. 168; but the decision of the District Court was reversed by the Court of Appeals for the Seventh Circuit, 226 F. 2d 949 (printed in Appendix C hereto, *infra*, pages xxvi to xxx), on the basis that Summary Judgment should not have been granted, and the case was remanded and now awaits trial.

---

1. Based in part upon the uncontested District Court Opinion of validity, and the Seventh Circuit's Opinion of invalidity, Aghnides petitioned this Court for review, but, rightfully, this Court denied that Petition.. 348 U. S. 826.

2. U. S. Patent No. 2,210,846, issued to E. P. Aghnides and entitled "Fluid Mixing Device".

JURISDICTION

The Judgment of the Court of Appeals for the Fourth Circuit was entered on May 17, 1957. Kress' timely Motion for Rehearing was denied in a Supplementary Opinion dated July 9, 1957.

This Court's jurisdiction is invoked under Title 28 U. S. C. § 1254(1). Jurisdiction is also based upon a direct conflict in the Opinions of the Courts of Appeals of the Fourth Circuit and the Seventh Circuit. *Universal Oil Co.* v. *Globe Oil Co.*, 322 U. S. 471, 473; 64 S. Ct. 1110, 1111.

Jurisdiction is also based upon the fact that there is pending substantial litigation in the Second Circuit[3] and Seventh Circuit[4] involving the Aghnides patent 2,210,846, which is the subject of this Petition; and in the interest of uniformity it is submitted that the conflict of opinions should be resolved.

Jurisdiction is also based upon the fact that one issue herein involves the International Patent Convention, an international "treaty" to which the United States has adhered since 1887. The issue presented is a substantial one, is one of first impression before this Court, and is of great public importance. It is important that this Court express itself on this substantial issue, since it involves a Treaty.[5]

3(a). *Marshall Metal Products* v. *Aghnides*, Civil Action 85-272, Filed June 3, 1953 in the District Court for Southern District of New York (2 App. 141).

(b). *Melard Mfg. Corp.* v. *Aghnides*, Civil Action 95-355, Filed September 16, 1954 in the District Court for Southern District of New York (2 App. 144).

4(a). *Aghnides* v. *Holden et al.*, Civil Action 50 C 1022, Filed July 19, 1950 in the District Court for Northern Illinois, Eastern Division (2 App. 137).

(b). *Melard Mfg. Corp.* v. *Chase Brass & Copper Co., Inc., et al.*, Civil Action 55 C 84, Filed Jan. 18, 1955, in the District Court for Northern Illinois, Eastern Division (2 App. 145 A).

5. United States Constitution—Article III, Section 2.

QUESTIONS PRESENTED

I. Where a foreign inventor, seeking the special privileges afforded him by the International Patent Convention, first applies for a patent in Belgium and thereafter files in both the United States and Canada other applications for patent, securing in both United States and Canada *identical* patent claims—monopolies—predicated upon *asserting* in the United States, and *repudiating* in Canada, continuity with the same Belgian application, then do the opposite positions of both *asserting and repudiating* continuity with the same Belgian application constitute a background of fraud or inequitable conduct which renders the United States patent invalid or unenforceable in equity?

In short—may an inventor misuse the International Patent Convention to remove a bar in order to obtain patent claims in the United States, and make a directly contradictatory sworn statement in order to obtain the identical patent claims in another country, both adherents to the International Patent Convention?

II. The Court of Appeals for the Fourth Circuit found patent 2,210,846 to be valid over the prior British patent to Felten.

The Court of Appeals for the Seventh Circuit found patent 2,210,846 to be invalid in view of the prior British patent to Felten.

(A) The broad question, raised by the conflict, is—Is the patent valid or invalid?

(B) A narrower collateral question presented is—Where Aghnides and the Patent Office both agreed during prosecution of the application for patent that the claims of patent 2,210,846 read on the device shown in Figure 8 of the patent, and where Aghnides now ad-

mits that Figure 8 is the same as the Felten prior art patent, then is not patent 2,210,846 invalid as a matter of law?

STATUTES AND TREATIES INVOLVED

The Statutes herein involved are the Patent Statutes, and in particular, R. S. 4886 and R. S. 4887, 35 U. S. C., § 102, printed in Appendix D hereto, *infra*, page xxxi.

The Treaty involved is the International Patent Convention, 53 Statutes 1748. Pertinent portions of the Treaty are printed in Appendix D hereto, *infra*, pages xxxii to xxxvii.

STATEMENT OF FACTS

I. The facts relevant to Question I are:

On December 8, 1934, Aghnides, a citizen of Greece (2 App. 30), filed application for patent in Belgium. The Belgian patent issued on January 31, 1935 (2 App. 11-18). Another Aghnides patent corresponding to the Belgian application issued in Great Britain on July 6, 1937 (2 App. 218-220).

On December 4, 1935, claiming under the International Patent Convention, Aghnides filed a first application for patent in the United States (2 App. 19-31).

The 1935 U. S. application corresponding to the Belgian application did not issue as a patent (2 App. 47). While the 1935 U. S. application was pending, Aghnides filed a second, new and different, U. S. patent application on December 31, 1937 (2 App. 49-60), resulting in the patent in suit, No. 2,210,846 (2 App. 1-5).

During the prosecution of the 1937 U. S. application, the issued Aghnides British patent was cited by the Patent Examiner as prior art (2 App. 71-72). The British patent would have been insurmountable opposition to the issuance of a patent. To avoid this basis of opposition, Aghnides asserted that the second filed 1937 U. S. application was for the same invention as disclosed earlier in Belgium (2 App. 58-59, 72-73), and hence was entitled to the benefits of the International Patent Convention, and to an effective filing date of December 8, 1934. (Since the Belgian filing date was prior to the filing date for the British patent, the assertion of continuity and similarity between the Belgian and the second filed U. S. applications was effective to obviate the Patent Examiner's rejection.) Only said representation and assertion to the U. S. Patent Office (of continuity and similarity between the Belgian and the second filed U. S. applications) induced the U. S. Patent Office to no

longer consider the Aghnides British patent as a prior art reference.

On August 6, 1940, patent 2,210,846 issued and bore on its face (2 App. 3), the assertion of continuity between it and the 1934 Belgian application.[6]

On November 15, 1939, nearly five years after the filing date of the 1934 Belgian application, Aghnides filed an application for patent in Canada (2 App. 323-335). Aghnides asserted in said application five claims identical with the five claims in the issued U. S. patent 2,210,846 (2 App. 345). The Canadian Patent Office, like the U. S. Patent Office, cited the 1937 British patent as a prior art reference (2 App. 359), and also inquired as to the status of the Belgian application upon which, Canada noted, the U. S. patent 2,210,846 based convention priority (2 App. 359).

Aghnides, in his reply to the Canadian Patent Office, on the question of Convention priority, *repudiated* any similarity between the U. S. patent 2,210,846 and the 1934 Belgian application, stating (2 App. 361):

> "There is an important fact to remember, however; the said Belgian 1934 application[7a] *did not* disclose fully the bubbly-stream principle disclosed in Holland, Sweden, the United States patent No. 2,210,846, the instant Canadian case and British Specification No. 625,084. (Emphasis is Aghnides'.)

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6. Incidentally, the Aghnides U. S. patent 2,316,832 which was also in issue in the trial of this case, also bears on its face an assertion of continuity between it and the 1934 Belgian application, as Aghnides asserted such continuity under the International Patent Convention before the U. S. Patent Office. The Trial Record conclusively shows that no such continuity exists, and that the reference in patent 2,316,832 to the 1934 Belgian Convention application is erroneous.

7a. This is the patent application which is referred to in the U. S. oath (2 App. 58-59), and which was relied upon to claim Convention priority for the U. S. Patent 2,210,846.

"It is only in December 1937[7b] that the ways and means of making a bubbly-stream were disclosed when the United States text (application No. 182,884) was rewritten, although the Convention Belgian application did mention the emulsion of air in a water stream.

"Therefore, the priority claims in the present case are correct and support properly the instant disclosure: *it is the Belgian Convention which, in the United States patent No. 2,210,846 confuses the issue* because, actually said Belgian case does not teach the bubbly-stream as it is known to-day. (Emphasis ours.)

"The same remarks apply also to the British Specification No. 468,687 which was filed December 4th, 1935, prior to the first disclosure of the bubbly-stream in United States, December 1937."[7c]

II. The facts relevant to Question II are:

The Aghnides patent 2,210,846 is entitled "Fluid Mixing Device". It is described as a device "for intimately mixing gas with a liquid" (2 App. 3, Col. 1, Lines 1-2), and is now known as an "aerator" for use on an ordinary home faucet.

The Felten (British) patent of 1909 (2 App. 275-277), upon which the Court of Appeals of the Seventh Circuit relied in holding the Aghnides patent invalid, is entitled "Improvements in or relating to Mixing Devices". The Felten specification states (2 App. 275):

"This invention relates to a new mixing device chiefly intended for producing such mixtures from a gas or vapour-like substance and a liquid substance . . ."

A specific use of Felten's mixing device is shown in the

7b. This date is 3 years after the Convention date claimed and appearing on Patent 2,210,846.

7c. The import of this statement is directly contrary to what Aghnides told the U. S. Patent Office (2 App. 73) when it cited the Aghnides British patent 468,687 as a prior art-reference.

U. S. Fuss patent, 1,090,044 (2 App. 299-305) as being mounted at the discharge end of an ordinary home faucet. Tests of a Felten device before the Trial Court showed that it delivered a non-splash bubbly stream of air and water. (1 App. 145, 149).

Aghnides' patent discloses a number of alternate forms of his device (2 App. 1). During the prosecution of his application for patent in the U. S., he affirmatively asserted that claims, which are here in issue, read on the form of device shown in Figure 8 of the patent (2 App. 95). The Patent Office agreed (2 App. 104).

Aghnides now admits that Figure 8 is like Felten and thus is old in the prior art. However, Aghnides now asserts, and the Fourth Circuit Court of Appeals has so held, that Figure 8 is outside the scope of the claims of the patent which is here in issue.

This latter holding of the Court of Appeals of the Fourth Circuit is in direct conflict with the Opinion of the Court of Appeals for the Seventh Circuit[8].

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8. In *Aghnides* v. *Goodrie et al.*, 210 F. 2d 859, 863 (Appendix B, *infra*, pages xxiv to xxv), the Seventh Circuit stated:

"* * * Felten reads literally on the claims of Aghnides * * *

* * * * * *

The important thing is that each introduces a vapor, a gas, ozone or air, into moving water in order to mix the two substances. It seems to us utterly immaterial that Felten's apparatus may also be used as a vacuum pump; so indeed may one form of Aghnides. Element for element, the two are the same * * * We conclude then that the trial court rightfully found that Felten anticipated Aghnides and taught the latter all that he needed to know in order to build his mixer of gas and fluid, *i.e.*, air and water."

REASONS FOR GRANTING THE WRIT

I. The Issues Relating to Patent Misuse, or Fraud, Under the International Patent Convention Are Ones of First Impression and Are of Great Public Importance.

Aghnides' claimed dates of invention, for the same invention, in the U. S. and in Canada are wholly contradictory. The date claimed in the U. S. is expressly *repudiated* in Canada. Both positions cannot be correct.

The alternative defenses presented by Kress were that—

(1) Aghnides falsified to the U. S. Patent Office (to remove the 1937 British patent as a reference), and therefore the '846 patent was invalid, as it was procured by fraud. *Hazel-Atlas Glass Co.* v. *Hartford Empire Co.*, 322 U. S. 238, 250; 64 S. Ct. 997, 1003.

(2) The undisclosed fraud perpetrated on either the U. S. or Canada as to the identical claims here in controversy disentitles the patentee to any equitable relief. *Precision Instrument Mfg. Co.* v. *Automotive Maintenance Machinery Company*, 324 U. S. 806, 816; 65 S. Ct. 993. 998.

(3) The false pre-trial testimony[9], to "cover up" and hide the fact that the claimed date of invention in Canada conflicted with the claimed date of invention in the U. S., disentitles the patentee to equitable relief. *Keystone-Driller Co.* v. *General Excavator Co.*, 290 U. S. 240, 244, 54 S. Ct. 146, 147.

(4) The misuse of the International Patent Convention to claim one date of invention in the U. S. and to claim a different date of invention in Canada, for identical claims here in controversy, disentitles the patentee to equitable relief. *Precision Instrument Mfg. Co.*

9. At pre-trial deposition Aghnides testified (1 App. 301), that his Canadian patent was based on his Belgian patent, and was filed within the one year period following the filing of the Belgian application (as provided for by the International Convention). The Canadian application was actually filed nearly five years after the filing date of the Belgian application (2 App. 323), and its file wrapper expressly denies that the Canadian application is based on the Belgian patent (2 App. 361).

v. *Automotive Maintenance Machinery Company,* 324 U. S. 806, 65 S. Ct. 993.

In its Opinion (Appendix A, *infra,* page xiii) the Fourth Circuit decided that Aghnides told the truth to the U. S. Patent Office, and declined to find that Aghnides' representations in Canada, even if they were untrue, constituted misconduct—

> "* * * so closely related to the proceedings in this country and the issuance of the patent to him here as to invalidate the grant or to constitute such unclean hands as to disentitle him to the relief he asks in this case."

In so holding, the Fourth Circuit committed the following errors of law:

First. The facts show that Aghnides has admitted, in Canada (2 App. 361):

> "* * * the said Belgian 1934 application *did not* disclose fully the bubbly-stream principle disclosed in * * * the United States patent No. 2,210,846 * * *",
>
> and
>
> "It is only in December 1937 that the ways and means of making a bubbly stream were disclosed when the United States text (application No. 182,884) was rewritten * * *", and
>
> "* * * actually said Belgian case does not teach the bubbly-stream as it is known today."

Despite these clear and unequivocal admissions by Aghnides, the Fourth Circuit Court stated (Appendix A, *infra,* page xiii):

> "* * * From our own examination of the United States patent '846 and the Belgian patent, we think it unquestionably true that they are, as Aghnides told the United States Patent Office, the same invention."

The Fourth Circuit's failure to consider the conclusive admissions against interest made by the patentee in a

foreign patent corresponding to the one in suit, appears to be in direct conflict with the rule of law enunciated by the Second Circuit in the case of *Jungerson* v. *Baden et al.*, 2 Cir. 166 F. 2d 807, 809 (affirmed 335 U. S. 560, 69 S. Ct. 269—Supreme Court—1949).

In the *Jungerson case*, the inventor's appraisal of his own invention, as was found to be stated in his British patent, was held, by the Second Circuit Court of Appeals, to be a controlling admission which was binding upon the inventor's U. S. patent. The *Jungerson* case thus stands for the proposition of law that an inventor's appraisal of his own invention and of the prior art relating to it, as appears in his own foreign patents, constitutes a binding admission against interest.[10]

The failure by the Fourth Circuit in the instant case to consider Aghnides' statements in Canada to be binding admissions against interest thus appears to be in direct conflict with the Second Circuit on this point of law.

Second. (a) The question of withholding equitable relief—because of the patentee's misuse of the International Convention, or by reason of his perpetrating a fraud upon Canada, under the Convention, based on his U. S. '846 patent—is one of first impression before the U. S. Courts.

(b) The refusal by the Fourth Circuit to withhold equitable relief based on the patentee's misuse or fraud under the International Patent Convention, and the Fourth Circuit's holding that Aghnides' Canadian patent proceedings (involving the identical patent claims here in issue which were procured in the U. S. under the Convention) "would not be so closely related to * * * the issuance of the patent to him here", failed to take cognizance of the pertinent Supreme Court decisions respecting rights and obligations under treaties.

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10. Also see *Sarazin et al.* v. *Wright Aeronautical Corp.*, 54 F. Supp. 244, 251 (affirmed 162 F. 2d 960, 2 Cir.—1947), wherein the same rule of law was invoked.

The Supreme Court has stated with regard to "treaties", *United States* v. *Belmont*, 301 U. S. 324, 330, 57 S. Ct. 758, 761, that:

> "A treaty signifies 'a pact made between two or more independent nations, *with a view to the public welfare*'." (Emphasis ours.)

The Supreme Court has also stated in regard to "treaties", in the case of *The United States* v. *The Libelants and Claimants of The Schooner Amistad, etc.*, 40 U. S. 518, 595, 10 L. Ed. 826, 854, that:

> "* * * In the solemn treaties between nations it can never be presumed that either State intends to provide the means of perpetrating or protecting frauds; * * *"

In view of what the Supreme Court stated in the *Amistad* case, *supra*, it must be presumed that the United States did not intend, in its grant of the '846 patent, to provide a means for perpetrating a fraud on Canada. However, the record is clear that the claims in the Canadian patent were there entered and allowed primarily because they were identical with the ones that had been allowed in the United States Patent Office (2 App. 345-346).

While it is not incumbent upon the Canadian Patent Office to be bound by the acts of the United States Patent Office, it may be stated, as a matter of common knowledge, that in the actual practice of patent law the acts of the United States Patent Office are given great weight (almost full faith and credit) by the Canadian Patent Office. It will be seen from the nature of the amendment (2 App. 345-346) that Aghnides sought allowance of claims in the Canadian Patent Office solely on the basis that the United States Patent Office had previously allowed the same claims.

Later, in the prosecution of his patent in the Canadian Patent Office, Aghnides repudiated the convention date

claimed in the United States patent, and thereby perpetrated his fraud.

Briefly, the facts show that Aghnides, to avoid a statutory bar in the United States (against the application resulting in U. S. patent 2,210,846), claimed his date of invention as of December 8, 1934 (the Belgian application's filing date)—and, to avoid a statutory bar in Canada (based on the Belgian application's filing date), Aghnides claimed his date of invention as of December 31, 1937 (the filing date of the U. S. application resulting in U. S. patent 2,210,846).

The patent claims in both U. S. and Canada are *identical*. However, the dates of invention of said *identical* claims is *different*. And, in the U. S., the Belgian 1934 application is said to be for the *identical* invention as in the U. S. patent—while in Canada, the Belgian 1934 application is said to be for a *different* invention than in the U. S. and Canada.

For the purpose of getting patent claims in Canada, the U. S. patent claims (obtained from the U. S. only because *identity* was asserted between the U. S. application and the 1934 Belgian application) were inserted into the Canadian patent application; and, to avoid a statutory bar in Canada (based on issued patents resulting from the 1934 Belgian application), the Canadian claims (identical with the U. S. claims) were stated to be for a *different* invention than the 1934 Belgian application—with the explanation that:

> "* * * it is the Belgian Convention which, in the United States patent No. 2,210,846 confuses the issue * * *" (2 App. 361).

This juggling of dates and Convention priority by Aghnides was deliberate and with the intent to obtain patent monopolies for which there was no legal justification, morally or in fact.

Thus, it was not the sole issue in this case, whether or not Aghnides told the truth in the United States or in

Canada, and it was not an issue to determine which of the two patents was obtained by fraud. If either of the two patents was obtained by fraud, that is sufficient for this Court to take an interest in the matter and to make its determination thereon. For, as was stated by the Supreme Court in the *Amistad* case (40 U. S. 518, 594, 10 L. Ed. 826, 854) with regard to rights which were being asserted under the provisions of a treaty:

> "* * * What we proceed upon is this, that although public documents * * * certainly are to be deemed *prima facie* evidence of the facts which they purport to state, yet they are always open to be impugned for fraud; and *whether that fraud be in the original obtaining of these documents, or in the subsequent fraudulent and illegal use of them, when once it is satisfactorily established it overthrows all their sanctity*, and destroys them as proof. Fraud will vitiate any, even the most solemn transactions, and an asserted title to property, founded upon it, is utterly void." (Emphasis ours.)

Aghnides' purpose and scheme was to obtain patents in as many countries as possible. By reason of the evidence that has been presented, it is unquestionable that a portion of his scheme was unlawful—regardless whether the unlawful portion of the scheme occurred in the United States or in Canada—and the scheme also involved the steps of obtaining of the U. S. patent, relying on the International Convention so to do, and thereafter using that patent as the basis for obtaining the identical claims in the Canadian patent, and repudiating the very basis that procured the same claims in the United States. As the Supreme Court has pointed out in the case of *Steele et al.* v. *Bulova Watch Co., Inc.*, 344 U. S. 280, 287, 73 S. Ct. 252, 256:

> "* * * acts in themselves legal lose that character when they become part of an *unlawful* scheme * * * (Citing cases). In such a case it is not material that the source of the forbidden effects upon * * * commerce

arises in one phase or another of that program * * * (Citing cases)" (Emphasis ours).

In the *Steele* case, *supra*, the Supreme Court also stated (344 U. S. 280, 282, 73 St. Ct. 252, 254) that:

> "* * * Congress in prescribing standards of conduct for American citizens may project the impact of its laws beyond the territorial boundaries of the United States * * * (Citing cases)."

Certainly the Courts of the United States, in the exercise of their equity power, may require, of those who seek equity before them, a standard of conduct with respect to acts involving the subject matter before them, even if such acts occurred outside the territorial boundaries of the United States, of the type which would have been required of the same party had the acts taken place within the boundaries of the United States. *Steele et al.* v. *Bulova Watch Co., Inc., supra; Precision Instrument Mfg. Co.* v. *Automotive Maintenance Machinery Co., supra; Hazel-Atlas Glass Co.* v. *Hartford Empire Co., supra; Keystone-Driller Co.* v. *General Excavator Co., supra.*

The "public welfare" purposes with which treaties are endowed (as stated by the Supreme Court in the *Belmont* case, *supra*), morally requires each signatory nation of a treaty

> (1) to affirmatively support the treaty's intents and purposes, and
>
> (2) to prevent persons, over which it has control, from either defying the treaty's intents and purposes, or from perpetrating frauds under the treaty on other nations adhering to the treaty.

It is against the interests of "public welfare" to extend benefits under an international treaty to one who, for selfish purposes, has both acted in derogation to the intent and purpose of the treaty and has also employed the treaty in

such a manner as to defraud another country adhering to the treaty.

The "public welfare" purposes of treaties, and the obligations of the U. S. to support the treaties to which it is a party, and basic equity principles, as enunciated by the Supreme Court in the cases cited, compels granting this Petition for Certiorari to permit the Supreme Court to rule on this question of great public importance.

II. The Conflicts Between Courts of Equivalent Standing, Created by the Opinion of the Fourth Circuit, Can Only Be Resolved by the Supreme Court, and Certiorari Should Be Granted.

The opinions of the Court of Appeals for the Fourth and Seventh Circuits are in direct conflict. The Fourth Circuit found patent 2,210,846 valid, and the Seventh Circuit found the same patent invalid. The conflict should be resolved. *Universal Oil Co.* v. *Globe Oil Co.*, 322 U. S. 471, 473; 64 S. Ct. 1110, 1111.

The Seventh Circuit found the '846 patent to be invalid in view of the British patent to Felten, No. 6012, of 1909. In comparing Felten and Aghnides the Seventh Circuit said (210 Fed. 2d 859, 862) (Appendix B, *infra*, page xxiv):

> "* * * Felten introduced ozone into water under pressure and mixed them. Aghnides introduced air into water under pressure and mixed them. Each called his process one for mixing a gas with a fluid. *Felten reads literally on the claims of Aghnides.*" (Emphasis ours.)

The Fourth Circuit's opinion nowhere points out wherein Felten fails to read literally on the claims of Aghnides, as the Seventh Circuit has stated, and hence the Seventh Circuit's statement stands unchallenged.

The Court of Appeals of the Fourth Circuit (and the

Trial Court before it) erred in three important respects in disregarding the Seventh Circuit's opinion:

First: The Fourth Circuit Court placed great emphasis on commercial success (Appendix A, *infra,* pages iv to v, viii), completely disregarding this Court's admonition that commercial success cannot make an invention where there is none. *Jungerson* v. *Ostby & Barton Co. et al.,* 335 U. S. 560, 567; 69 S. Ct. 269, 272.

Second: The Fourth Circuit's Opinion states (Appendix A, *infra,* page iii) that Judge Hayes concluded in effect that:

> "* * * Felten operated on a different principle and did not achieve the result of Aghnides."

However, that conclusion, affirmed by the Fourth Circuit's Opinion, is completely contrary to the Opinion of the Seventh Circuit and to the unquestioned facts in this case.

What the alleged "different principle" is, cannot be discerned either from the patent's specification, the claims of the patent, or from the facts educed at the trial. It is not controverted that both Aghnides (2 App. 1-4) and Felten (2 App. 275-277) use a jet of water for creating a suction that sucks air through a lateral inlet into a mixing chamber, and, therefore, Aghnides and Felten are qualitatively the same. Aghnides sucks air. Felten sucks air which contains ozone (2 App. 275). Aghnides uses screens as a resistance for mixing the water and air. Felten uses perforated plates as a resistance to mix water and ozone-air (2 App. 275-277). Both devices produce a bubbly non-splash stream, as is disclosed in the trial record (1 App. 145, 149, 154)—and as was also noted by the Court of Appeals of the Seventh Circuit, before whom tests were run in open court (Appendix B, *infra,* p. xxiv).

As to the quantitative results achieved, while both the Trial Court and the Court of Appeals state that Felten

does not obtain the same results, it is uncontroverted that Aghnides admitted in his foreign patents, corresponding to patent 2,210,846, that his resultant jet:

> "* * * may comprise 30 to 40 per cent by volume of air" (2 App. 392).

The tests of the Felten device in open court, which were made by Aghnides on models that Aghnides himself had constructed, showed that Felten produced a resultant jet having:

(a) 33⅓% by volume of air (test of Plaintiff's Exhibit 44; 2 App. 217) and

(b) 41.2% by volume of air (test of Plaintiff's Exhibit 56; 2 App. 217).

Thus, the facts herein established that Aghnides and Felten are, contrary to the Fourth Circuit's Opinion, the same both qualitatively and quantitatively.

Third: In disregarding the fact that the Claims of the Aghnides patent read on Figure 8 of patent 2,210,846, the Court of Appeals of the Fourth Circuit not only ignored the Seventh Circuit's opinion and misapplied the applicable law, but also ignored unequivocal admissions in the file wrapper of the patent and decided this case in direct conflict with many decisions of the Court of Customs and Patent Appeals involving similar fact situations, thereby creating an additional conflict between courts of equivalent standing, which conflict may be resolved only by this Court.

The Seventh Circuit had stated (210 F. 2d 859, 863):

> "* * * It seems to us utterly immaterial that Felten's apparatus may also be used as a vacuum pump; so indeed may one form of Aghnides. Element for element, the two are the same." (Appendix B, *infra*, page xxv.)

In so stating, the Seventh Circuit was referring to Figure 8 of the Aghnides patent.

In drawing an issue between its decision and the decision of the Seventh Circuit, the Fourth Circuit stated (Appendix A, *infra*, page ix):

> "* * * We consider it immaterial that Figure 8, which is not covered by any of the claims, was not omitted in the granted patent."

And further, in discussing the Seventh Circuit's opinion, the Fourth Circuit stated (Appendix A, *infra*, pages ix to x):

> "* * * The reference must have been to Figure 8, the only form of Aghnides that can function as a pump; *but this form is outside the claims,* because it does not respond to their terms or produce the desired result of an aerated stream." (Emphasis ours.)

Nowhere in its decision does the Fourth Circuit show how Figure 8 does not respond to the terms of the claims. Furthermore, during prosecution of the application in the Patent Office, Aghnides had stated (2 App. 95):

> "Claim 55 (Claim 2 of the issued patent) is along the same lines as Claim 54 (Claim 1 of the patent) but specifies a means for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air, and other means for uniting the aerated water to form a coherent jet. *This form of claim will read on Figs. 4, 5, 6, 7 and 8.*" (Emphasis ours.)

Thus, Aghnides asserted positively that the claims of the patent read on Figure 8. And in his Brief before the Board of Appeals, Aghnides stated (2 App. 106-107) that all of the modifications shown in Figures 1, 2, 4, 5, 6, 7 and 8:

> "* * * produce the same kind of a coherent white jet and make it in the same manner * * *"

And, furthermore, the Patent Examiner agreed with Aghnides as to the readability of the claims, and asserted

to the Board of Appeals that claims which issued in the '846 patent, read on the species of Figure 8 (2 App. 104).

When Figure 8 was again called to the Fourth Circuit's attention by Kress' Motion for Rehearing, the Fourth Circuit Court then conceded in its Supplementary Opinion that devices covered by the claims of the patent embody the Venturi principle as also embodied in Figure 8 (Appendix A, *infra*, page xviii), but still insisted that the patent claims call for "more", and insisted that the "more" is not found in Figure 8. In explaining re the "more" the Fourth Circuit noted that Figure 8 uses a *fluid* flowing through a pipe for drawing to itself *fluid* from another pipe, while the patent claims are directed to *water* flowing through a pipe for drawing to itself *air* (App. A, page xviii). While the Court was thus differentiating between Figure 8 and the patent claims, it failed to observe that *Felten* is the same as Figure 8 plus the same "more" that the Court itself had stressed—namely, Felten provides a Figure 8-type device wherein *water* flows through a pipe for drawing to itself *air*, and hence the patent claims, since they include and read on Figure 8 plus "more", must also read on *Felten*.

Additionally, Aghnides' present position, as sustained by the Court of Appeals for the Fourth Circuit, that certain forms of his device shown in his patent are patentable over, and with respect to the admittedly old alternate form of device shown in Figure 8, is in *direct conflict* with a time-tested and uniformly adhered to rule of Patent Law that has many times been reiterated by the Court of Customs and Patent Appeals[11] (a Court whose Appellate

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11. Some of these CCPA cases are:
Application of McCarn, 212 F. 2d 797, 799 (CCPA-1954);
Application of Stewart, 222 F. 2d 747, 754 (CCPA-1955);
Application of Lindberg, 194 F. 2d 732, 736 (CCPA-1952);
and the many supporting cases cited in these decisions.

jurisdiction is at the same level as that of the Court of Appeals of the Fourth Circuit) to the effect that:

> Where the inventor's own specification discloses an equivalency between two alternate constructions, and where one of the alternative constructions is anticipated by the prior art, the inventor may not argue for patentability with respect to one of the alternatives as compared to another.

Aghnides' position, as sustained by the Court of Appeals for the Fourth Circuit, is that certain of the alternative constructions shown in the Aghnides patent are patentable with respect to the alternative shown in Figure 8. But under the rule of law enunciated by the CCPA, an inventor may *not* argue for patentability of one alternative as compared to another. This conflict between Courts of equivalent standing should be resolved.

The foregoing errors clearly point up the conflict that exists between the decisions of the Court of Appeals of the Seventh Circuit and the Court of Appeals of the Fourth Circuit on the question of validity of patent 2,210,846. This question can ultimately be decided only by this Court.

III. A Decision by the Supreme Court of the Issues Raised Would Settle the Confusion Created by the Conflicting Opinions and Would Forestall Excessive Future Litigation Involving Patent 2,210,846.

The conflict in decisions between the Fourth and Seventh Circuits will now create confusion as to what the law should be with respect to the validity of patent 2,210,846.

There are four (4) other cases involving this patent awaiting trial, two of the cases being in the New York District Court, and the remaining two being in the Chicago District Court (see footnotes 3 and 4 *supra*, on page 3

of this Petition). Both of these courts have crowded calendars.

Unless the issue of validity of this patent is decisively resolved by this Court, there will be a tendency to litigate each and every one of those cases, as the patentee Aghnides has shown his disposition toward trying and retrying, again and again, the question of validity of this patent before the Courts (See Judge Schnackenberg's Opinion, in Appendix C, *infra*, pages xxix to xxx). The uncertainty which exists throughout the United States as to the validity of this patent, now enhanced by the conflict in decisions, will probably lead to expensive and time-consuming trials of the pending cases, and to Appeals of those cases to the various Courts of Appeals.

The inability of lower courts to remedy this situation respecting this particular patent was the basis of Judge Schnackenberg's separate concurring opinion in the *Holden* case reported at 226 F. 2d 949 at page 951 (Appendix C, *infra*, pages xxix to xxx).

In the interests of uniformity of decisions, and to forestall excessive consumption of lower courts' time, this Petition should be granted.

CONCLUSION.

For the reasons stated, this Petition for Writ of Certiorari should be granted.

Respectfully submitted,

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September 23, 1957.

(Appendix Follows)

APPENDIX A.

UNITED STATES COURT OF APPEALS
For the Fourth Circuit.

No. 7294.

S. H. Kress & Company,
Appellant,

versus

Elie P. Aghnides and
Chase Brass & Copper Company, Inc.,
Appellees.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF NORTH CAROLINA, AT GREENSBORO.

(Argued January 9, 1957. Decided May 17, 1957.)

Before PARKER, Chief Judge, and SOPER and SOBELOFF, Circuit Judges.

SOBELOFF, Circuit Judge:

From a decree of the District Court holding valid and infringed two patents relating to devices for aerating water, particularly adapted for use in household faucets, this appeal was taken. The patents are 2,210,846, issued to Elie Aghnides, August 6, 1940, and 2,316,832 for an improvement thereon, issued to him April 29, 1943. The suit was

originally filed by the patentee, but later Chase Brass & Copper Company, Inc., holder of a license from him, took an assignment of the patents and, by leave of Court and with the consent of the defendant, became an additional party-plaintiff.

The purpose of the patented devices is to obtain a coherent, aerated stream of water that will not splash as it emerges from a domestic faucet. The device is attached to a kitchen water tap and consists essentially of a chamber into which both water under ordinary pressure and air are delivered and intimately mixed so that the stream issuing therefrom is a mixture of water and entrained bubbles. Because of the great volume of air in the mixture the water is soft and produces a large volume of suds when mixed with soap. The result is effected by projecting water through small apertures in a diaphragm at the upper or inlet end of the chamber, thereby breaking the water into mulitple jets as it enters into the chamber. Air is drawn into the chamber through openings in the side and is mixed with the water therein as a result of turbulence of the water as it strikes resistance elements in the chamber preventing the free through-flow of the water. At the outlet of the chamber a fine screen or screens are located. The combination is typically described in the first claim of the basic patent '846, which is quoted in the margin.[1]

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1. "A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet."

The improvement patent, '832, combines the basic elements of the above with a second perforated diaphragm or restricted orifice, or both, at the upstream end of the aerator, to obtain a more perfect stream of soft, splashless, bubbly water.

The District Judge held both patents in suit valid and infringed, in spite of the fact that the first patent, '846, had previously been declared invalid by the United States Court of Appeals for the Seventh Circuit because anticipated by the Felten English patent. *Aghnides* v. *Goodrie,* 210 F. 2d 859. The District Judge's opinion observed that in approaching his task he felt constrained to follow the Seventh Circuit if the evidence warranted it. Expressing proper deference for the opinion of that Court he, however, found himself unable to agree with it. As the Court of Appeals itself declared in *Aghnides* v. *Holden,* 226 F. 2d 949, its *Goodrie* decision is not *res adjudicata,* even in the same Circuit, since there was no privity between the defendants in the two actions.

After a long trial and many experiments conducted in his presence in the courtroom, District Judge Hayes concluded that Felten operated on a different principle and did not achieve the result of Aghnides. One after another of the observations made in the *Goodrie* opinion, suggesting similarities between Felten and Aghnides, were fully answered by highly persuasive visual evidence to the contrary.

The same Rule of Practice (Rule 52(a) F.R.C.P.) upon which our brethren in the Seventh Circuit relied in upholding the findings of their District Judge as not clearly erroneous would warrant our putting equal reliance in the presumptive correctness of District Judge Hayes' contrary conclusions. However, to avoid unnecessary conflict between the Circuits, we deemed it our duty to address ourselves independently and with special care to an examina-

tion of the District Court's findings. Of course, our review is of the record made in the District Court below, which is different from the *Goodrie* record, and appears to be more detailed and comprehensive.

Turning more particularly to the '846 patent, it may be noted that in the instant case, further supporting this presumption of correctness is the provision of the Patent Act (35 U.S.C.A. 282), which puts the burden of establishing invalidity upon the party asserting it; and the usual presumption of validity is strengthened by the history of this patent in the Patent Office. It was granted only after considerable controversy and after review by the Board of Appeals, where the references relied upon by the defendant were all closely considered by administrative officials possessing special competence in the field.

It is noteworthy that 21,000,000 units embodying the patented device have been sold in this country, and licenses have been taken by large concerns like Chase Brass & Copper Co., Firestone Tire & Rubber Co., and Chicago Faucet Co. Chase Brass alone had up to the time of the trial paid royalties on more than 16,000,000 of its "Spring-Flo" units made according to the Aghnides teaching. Before taking the license it had conducted an extensive search of the art and made unsuccessful attempts to attain the results of the Aghnides invention by other means. By the payment of substantial royalties, such business concerns attest their opinion of the merit of the patent. While it is true that commercial success does not determine either invention or the validity of a patent, nevertheless, in a doubtful case it may be a convincing factor. *Great Atlantic and Pacific Tea Co.* v. *Supermarket Equipment Corp.*, 340 U.S. 147, 153; *Textile Machine Works* v. *Hirsch Textile Machines, Inc.*, 302 U.S. 490, 498; *Smith* v. *Ball*, 301 U.S. 216, 233. Before this invention, no water aerator that could be used in connection with a household faucet had

been successfully marketed. The wide acceptance and use of this item, which has become standard equipment in the plumbing supply industry and is used by leading faucet manufacturers and has been installed in millions of homes, are circumstances not without significance.

Like the District Court, we are unable to agree that this patent was anticipated by the Felten British patent No. 6012 of 1909, or the corresponding United States patent No. 1,090,044, issued to Fuss. The drawings of the Felten patent have a superficial resemblance to the patent in suit, but on closer examination Felten will be found to be different. Felten operates on a different principle, is designed to achieve a different result, and has never been utilized, as has the plaintiffs' patent, to supply the householder with a soft, coherent, splashless stream of aerated water. The purpose of the Felten patent was to add ozone to water to sterilize it, and it is not shown that it was ever actually used even for this purpose. Judge Hayes had the benefit of witnessing the operation of demonstration equipment—a tank with faucets for the attachment of aerators, with a pump for circulating water from the tanks through the faucets, and with a pressure gauge and a vacuum gauge. The testimony is singularly free from the confusions which often creep into the record of courtroom demonstrations, and is clear and understandable. With respect to the Felten patent, the Court found (Finding XXVII (f)):

> "This device is also designed to secure a vacuum. Models thereof were demonstrated to the Court by plaintiff from which Felten's construction, mode of operation and results were made evident. Felten's device does not produce the fully aerated, soft, stream characteristic of Aghnides and does not operate on the same principle or use the same combination of elements. * * *. Felten is so constructed that the energy of the water is spent in creating a vacuum and not in securing aeration. Demonstration showed that it adds less than 5/10 of a cubic inch of air to 1 cubic inch of

water whereas Aghnides' aerator adds 6 cubic inches or 12 times as much.

"Not only was it demonstrated that Felten's result is different but that he secures his result by different elements and by a different mode of operation. The patent states that the result is secured by means of a 'conically widening chamber e, the widening of which produces in a well known manner the suction of the gas from the perforation d owing to the flow of the liquid from the perforation c into the widened chamber e'. (Felten Patent, p. 1, line 28). This has no counterpart in Aghnides. Felten, to secure his result, must keep the chamber flooded—the exact opposite of Aghnides. This was demonstrated by a transparent model (Exh. 44) which made it possible to see that the widening chamber was at all times flooded and that there were no individual jets striking Felten's baskets. The flooding of the chamber was also demonstrated by drilling a hole into a widening chamber whereupon water squirted out and, when the air through the inlet provided by Felten above the chamber was cut off no air entered any place and the device became inoperative even as a vacuum pump. Felten's necessity for flooding was also demonstrated by eliminating the flooding (by removing the outlet baskets) under which circumstances the device produced a mere jet of water with neither vacuum nor aeration. This is a fundamentally different mode of operation than Aghnides as could be seen from the demonstration of an Aghnides' aerator with the sides cut out (P. Exh. 39). The chamber in Aghnides is not a widening one as in Felten and was not flooded but on the contrary contained only the naked water jets in free air striking his resistance screens.

"The fundamental nature of the difference between the Felten device and the Aghnides' aerator was also visually demonstrated to this Court by providing a Felten device (P. Exh. 42) with greatly increased resistance below his baskets—in the amount of 21 screens! The device none the less created substantially the same amount of vacuum as it did without the

screens, showing that the intended function of the device was not changed even by a great change in the amount of resistance. On the other hand, when the resistance of an Aghnides' aerator (P. Exh. 42) was increased by adding only three screens its proper proportioning was destroyed, the device flooded and it became useless for its intended purpose. It was also demonstrated that Felten's baskets are not essential to his operation and are not elements corresponding to Aghnides' essential resistance screens or shoulders; when Felten's baskets were removed, his device would still operate with a flooded chamber and produce his high vacuum."

The foregoing findings are supported by substantial evidence, pointed and convincing, and we are persuaded that they should not be set aside. They show that while in Felten some air was present, increase in the amount of air would defeat the operation of the device, since what was desired was a vacuum; whereas in Aghnides the presence of a large quantity of air was desired to effect aeration, which is the heart of the invention. Unless these solidly grounded findings are to be disregarded completely, we must conclude that the Felten British patent No. 6012 of 1909 and the corresponding United States patent, Fuss, No. 1,090,044, do not anticipate the patent and do not indicate invalidity for lack of invention thereover.

The other patents cited by the defendants also failed to produce the objective of the Aghnides device. They were never applied to the purpose of the Aghnides patent. In Court these earlier patents emitted violent, splashing, divergent streams without the desired aeration. None of them refers to the problem to which Aghnides addressed himself. The prior art patents, other than Felten, which were chiefly relied on by the defendant, are Solomon and Hyatt. The Solomon British patent No. 405,316, for example, intended to aerate beer, produces no bubbly stream comparable to

that produced by the Aghnides device. The admission of a slight quantity of air increases froth on beer sufficient for the desired purpose. It will not perform the same function as Aghnides, as was demonstrated before the Trial Judge. The British patent Hyatt, No. 326,221, is a massive device for purifying water for cities or large industrial installations, and is not addressed to the objective of delivering an aerated stream of water at the point of use.

Other patent references are even wider of the mark. None is the counterpart of patent No. 2,210,846 in principle, operation, or results, as the demonstrations proved step by step and in detail. Even the speculations as to how certain modifications in pre-existing devices might adapt them to achieve the desired result were refuted by actual experiments in open court. The demonstrations in the District Courtroom are entitled to special weight, because resemblances and differences not readily noted from verbal descriptions or graphic illustrations were made vivid by use of models constructed of transparent material to make the operation of the various devices of the experiments clearly visible.

The usual defense that the result would have been obvious to one skilled in the art cannot avail the defendant here. Obviousness does not mean that one skilled in the art can perceive the solution after it has been found and pointed out by someone else; the test of obviousness is as of an earlier time, when the search is on. If the answer to the riddle were in fact discoverable as readily as the defendant now claims, it seems incredible that with a latent demand strong enough to result in the sale of 21,000,000 units of this device, the persistent researchers in the industry who were engrossed by the problem would have been blind to the solution found by Aghnides.

We conclude that the '846 Aghnides device was inventive and not merely within the ordinary skill of the art; and

that it was not anticipated by the prior art. The District Judge's findings are not only adequately supported, but accord with our own appraisal of the evidence. . . .

Defendant contends that because plaintiff admits that Figure 8 of the '846 patent[2] is the prior art, the claims in the patent are invalid. The complete answer is that the claims are not directed to this figure and do not read upon it any more than they read upon Felten. The scope of the claims is controlling, not the figures in the drawing. A form shown in a drawing is not necessarily covered by the granted claims. When an application for a patent is filed, many forms may be shown and an attempt made to cover them all in the claims as originally presented. During the prosecution of the application, however, the claims may be restricted in the light of the prior art. In the end, only certain of the forms shown may be covered by the restricted claims. Whether the forms not covered by the surviving claims remain in the patent or are cancelled from the drawing is immaterial, for the claims, and not the drawings, control. We consider it immaterial that Figure 8, which is not covered by any of the claims, was not omitted in the granted patent. *Denominational Envelope Co.* v. *Duplex Envelope Co.*, 4 Cir., 80 F. 2d 188, 192; *Bassick Co.* v. *Faultless Caster Corp.*, 7 Cir., 105 F. 2d 228, 231; see also *Freedman* v. *Friedman*, 4 Cir., 242 F. 2d 364.

The opinion of the Seventh Circuit commented on the fact that one form of Aghnides' device may be used as a vacuum pump and, apparently, largely for this reason, invalidated the Aghnides patent as an equivalent of Felten's prior patent. The reference must have been to Figure 8, the only form of Aghnides that can function as a pump;

2. Figure 8 illustrates a device for mixing two or more fluids. It exemplifies what is known to the prior art as the Venturi principle, namely, that a stream of fluid under pressure in a pipe of increasing diameter will create a suction and draw to itself the fluid from a converging pipe.

but this form is outside the claims, because it does not respond to their terms or produce the desired result of an aerated stream.

Contesting the charge of infringement, the defendant undertook to distinguish the accused device, called "Mel-O-Flo," manufactured by Melard Manufacturing Co., from that of the plaintiffs. The defendant's aerator has, at the top of the chamber, a diaphragm with small orifices through which the water from the faucet goes, and below the diaphragm is a casing with lateral holes for the admission of air. The diaphragm is formed by a ring and a plate that is seated in the ring. The plate is provided with teeth. The plate itself is not perforated, but when the parts are brought together, there are openings around the border through which the water can escape downward. This is substantially like the apertured plate or plates at the upper end of the chamber in the plaintiff's device.

The defendant's contention of non-infringement is that the accused device, unlike that of the plaintiffs, does not utilize "resistance screens" to effect break-up or mixing of the water and air. The claims of the patent, however, are broader and are not limited to such screens. As pointed out above, claim one simply calls for "means in the path of the stream of water . . . for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air . . . ." Clearly, this language applies as well to the accused structure as to numerous figures of the '846 patent. The fact that the defendant's structure uses an "onion" and the inner surfaces in the chamber and a single outlet screen to create the necessary resistance, whereas Aghnides uses a plurality of screens, is an immaterial circumstance. They are equivalents in every sense. The claims of the '846 patent clearly read on the defendant's structure. See *Graver Mfg. Co.* v. *Linde*, 339 U.S. 605, 607.

The second patent, '832, which is claimed to be an improvement upon the first, covers the same general combination as the basic patent, plus an added element, an additional apertured diaphragm in the upper part of the chamber, or a restricted orifice upstream of the chamber, or both. This is set forth in claim one as a "foraminous member upstream of the apertured diaphragm"; in claim two as a "restricted orifice upstream of the apertured diaphragm"; in claim three as a "restricted orifice and foraminous member upstream the apertured diaphragm"; and in claim four as "superposed apertured diaphragms at the upstream end of the chamber through which water is adapted to be forced into the chamber with substantial velocity."

But the Aghnides original, or '846 patent, had already taught the use of a perforated diaphragm at the upstream end of the chamber to force water into the chamber with substantial velocity. Merely adding another perforated diaphragm or diaphragms at the upstream end, or another screen or screens at the outlet end, introduces nothing new, especially as the earlier patent had shown that perforated plates or screens could be used in either position, and that "even better results can be obtained if two or more superposed screens are used in the outlet discharge." Adding interchangeable screens or diaphragms at the other end is merely a means of maintaining the proportion between inlet and outgo, and does not rise to the level of invention over the earlier patent. Nor does the second feature of the '832 patent introduce novelty in the device or in the result to be achieved by it. Merely noting that "when the water is discharged [into the chamber] through a restricted orifice [a narrow pipe] that the flow through the orifices in the upstream diaphragm is improved," is—in the context of all that had gone before, including Aghnides' own contribution—too meagre a discovery to be regarded as invention.

The changes seem to be the normal and obvious result of skill and experience gained in the practice of the '846 invention. They are entitled to no new patent, for they are variations in the application of the principle already disclosed, and are of no important consequence mechanically and should be accorded no significance legally. We conclude that the '832 patent is invalid. See *Atlantic Works* v. *Brady*, 107 U.S. 192, 200; *Wine Ry. Appliance Co.* v. *B&O R.R. Co.*, 4 Cir., 78 F. 2d 312, 319, and others there cited.

A considerable portion of the defendant's briefs and the argument before us was concerned with matter not in the record, but attempted to be raised by motion to reopen the case many weeks after the conclusion of the trial, which lasted over a long period of months. Therein the defendant offered to show that Aghnides had represented to the Canadian Patent Office that the inventions of his Canadian applications corresponding to the patents in suit were not the same inventions as those covered by a prior Belgian application made by Aghnides; whereas in the United States, to get the benefit of an earlier date, he had previously represented that the invention of the United States application was the same as that of the prior Belgian application.

Ordinarily, whether or not a case shall be reopened for the reception of additional testimony is in the discretion of the Trial Judge, which discretion will not be disturbed on appeal. Particularly is this so where the party moving to reopen has had long and full opportunity to develop the information he now seeks to present, but did not do so during the pendency of the trial. In this case, we are the more strongly disinclined to interfere with Judge Hayes' exercise of discretion, because on the documents before us, we fully agree with his comment that even if the case were reopened, the proffered testimony would not alter the result.

From our own examination of the United States patent '846 and the Belgian patent, we think it unquestionably true that they are, as Aghnides told the United States Patent Office, the same invention. Whether or not on another occasion Aghnides made an inconsistent claim in Canada to obtain a patent there, is an issue that we need not decide. If he made a misstatement there, this might bear upon the validity of his Canadian patent. It would not alter the fact that what he told the United States Patent Office was the truth and that the patent here was obtained without deception or fraud. Even if we were to assume what we are not prepared to adjudicate, that the inventor's representations to the Canadian Patent Office were untrue, this misconduct would not be so closely related to the proceedings in this country and the issuance of the patent to him here as to invalidate the grant or to constitute such unclean hands as to disentitle him to the relief he asks in this case.

Defendant complains of the trial court's failure to dismiss the complaint as to Chase Brass and Copper Company, Inc. The argument is that although Chase became a party plaintiff with the consent—almost insistence—of the defendant, and defendant does not complain of the intervention of Chase, nevertheless, no relief should be entered in favor of this plaintiff and the case should be dismissed as to it, because Chase failed to prove infringement after the assignment of the patent to it. Yet the defendant argued that no injunction should be granted at the instance of Aghnides, because he no longer is the owner of the patent. Accordingly, although the Court has before it Aghnides, who was the owner when the infringement occurred, and Chase, his assignee, injunctive relief, it is said, is not to be allowed. We find no merit in the defendant's contention,

raised for the first time on this appeal, especially as it consented to the admission of Chase and announced its intention to utilize against Chase any decree that might be rendered against it. With all parties in interest before the Court, it was in a position to do complete justice.

Affirmed in part and reversed in part, and remanded for the passage of a decree in conformity with the views herein expressed.

APPENDIX A.

UNITED STATES COURT OF APPEALS
For the Fourth Circuit.

No. 7294.

S. H. Kress & Company,
Appellant,

versus

Elie P. Aghnides and
Chase Brass & Copper Company, Inc.,
Appellees.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE MIDDLE DISTRICT OF NORTH CAROLINA, AT GREENSBORO.

Before PARKER, *Chief Judge* and SOPER and SOBELOFF, *Circuit Judges.*

SUPPLEMENTARY OPINION ON MOTIONS FOR REHEARING.

Filed July 9, 1957.

PER CURIAM:

Both parties have submitted motions for rehearing. The plaintiffs contend that the Court's opinion, in holding the

improvement patent No. 2,316,832 invalid over the basic patent No. 2,210,846, ignored the rule as to co-pending patents.

Ordinarily, a patent, to be valid over the prior art, must be an advance over the *whole disclosure* contained in the specifications or claims of a prior patent. This rule will normally apply even where the applicant is the same person to whom a prior patent was issued, because whatever is *disclosed* but not claimed by the former patent will be considered as abandoned to the public. However, where the applicant files a second application while the earlier one is still pending in the Patent Office, and the first patent contains disclosures not embodied in the claims, he is not barred from embodying the unclaimed disclosures in the later application. In such case, because the first application has still not been made public when the second is filed, the unclaimed disclosures of the first patent are not deemed an abandonment preventing their being claimed in the second. *Traitel Marble Co.* v. *Hungerford Brass and Copper Co.*, 2 Cir., 22 F. 2d 259, 261.

To be patentable, however, the claims of the second patent must be for a different invention than that claimed in the first patent. *Traitel Marble Co.* v. *Hungerford Brass and Copper Co.*, supra; *Montgomery Ward* v. *Gibbs*, 4 Cir., 27 F.2d 466; *Jordan* v. *Hemphill*, 4 Cir., 180 F.2d 457; *Standard Brands* v. *Federal Yeast Corp.*, D. C. Md. (Soper, J.), 38 F.2d 314; *Weatherhead Co.* v. *Drillmaster Supply Co.*, 7 Cir., 227 F.2d 98; *Danbury Fur* v. *American Hatters*, 2 Cir., 54 F.2d 344; *Sturtevant* v. *Massachusetts Hair Co.*, 1 Cir., 122 F.2d 900; *In Re Sherman*, C.C.P.A., 121 F.2d 527. If the second application merely claims the same invention on which the applicant has already been awarded a patent, he will, of course, not be permitted, by double patenting, to extend his monopoly beyond seventeen years. The policy of the law is to protect the inventor by granting

him a monopoly for a limited term, but upon its expiration the public is entitled to practice his invention in all its modifications and variations. There is certainly no reason to grant him a monopoly for an extended period upon a variant of his patent which would be obvious to one skilled in the art.

The *Traitel* case, supra, in which the opinion was by Judge Learned Hand, is sometimes cited for the proposition that the claim of the second patent need not be inventive at all, if the application is filed while the applicant has a pending prior application. But a careful reading of that opinion, as well as the other cases cited above, shows that what Judge Hand meant and said was that the claim of the second application need not be a patentable advance over the *disclosures of the specifications* (as distinct from the claims) of the first application. All agree that a patentee cannot re-claim what has already been claimed and patented by him.

Neither the narrowing of the inlet end of the aerator, nor the addition of "a foraminous member" makes the second patent a separate invention. Even disregarding the specifications and looking solely at the claims of the two patents, it is plain that the two involve the same patentable invention. The claim of the second patent speaks of "a foraminous member upstream the apertured diaphragm," while the claim of the first patent mentions only the upstream "diaphragm"; but the terms mean the same thing. It is true that in the claims of the first patent, only one such diaphragm is prescribed, while the claim of the second is for more than one such member; but there is no significant difference between the claims of the two patents.

Changing some of the functioning parts of a device may constitute an independent invention, but merely adding more of the same thing is not ordinarily a separate invention. For example, in the *Gibbs* case, supra, of the five major

functioning parts of the second patent, only two had appeared in the claims of the earlier patent, and what the court considered the heart of the second patent was not claimed in the first. By contrast, in our case, nothing new or different is claimed in the second patent that was not in the claims of the first.

DEFENDANT'S MOTION.

Defendant's motion for rehearing alleges error in the opinion with regard to the discussion of Figure 8 in the basic patent No. 2,210,846. We held that the claims do not read on Figure 8. The defendant's petition for rehearing says that the plaintiff has admitted that his claims operate, like Figure 8, on the Venturi principle. While this is true, it does not follow that the claims read on Figure 8, because although they utilize the Venturi principle, they do not operate on that principle alone. Figure 8 embodies the Venturi principle only, and nothing more; it provides merely for a pipe, with a fluid flowing through it, drawing to itself the fluid from another converging pipe. The claims, however, which relate not to figure 8 but to the other figures, are for a device designed to draw air to the pipe containing water, and to break up the water, mix it with air, and achieve aerated water.

Both motions for rehearing will be

Denied.

APPENDIX B.

IN THE UNITED STATES COURT OF APPEALS
For the Seventh Circuit

No. 10910 OCTOBER TERM, 1953, JANUARY SESSION, 1954.

ELIE P. AGHNIDES,
Plaintiff-Appellant,

vs.

JOSEPH J. GOODRIE, ET AL.,
Defendants-Appellees.

Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division.

February 24, 1954.

Before MAJOR, *Chief Judge*, LINDLEY and SWAIM, *Circuit Judges.*

LINDLEY, *Circuit Judge.* Plaintiff's suit for infringement of his patent 2,210,846, applied for in the United States December 31, 1937, and in Belgium December 8, 1934, and allowed August 6, 1940, having resulted in a judgment of invalidity and dismissal of the action, he brings this appeal.

The device of the patent is not complicated in structure or operation. The inventor described it as a "fluid mixing device," "for intimately mixing a gas with a fluid." Apparently the only practical use experienced has been in mixing air and water, or "aerating water." Claim 1 which is typical of all, five in number, appears in the foot-

note.[1] It is clear that the patentee's conception envisaged an attachment for a water tap from which water flows under pressure and enters the contrivance at the top, passes through an aperture or apertures or a screen near the top thereof thus dividing and separating the stream as it continues into a mixing chamber, into which incoming air enters through air ports leading into the chamber, thus mingling the air with the rushing water. The mixture of air and water then continues to the outlet, passing over barriers or screens, thus causing to flow from the outlet into the kitchen sink or other receptacle an aerated stream of water, which falls in what is called a "coherent" stream whitish in color, due to the added air, without splashing or spattering. It is said also that such aerated water lends itself more readily to the efficient use of soap. Thus the housewife finds the "mixer" or "aerator" helpful in her housework. The whole idea then embraces water under pressure flowing from an open faucet into a chamber after it has been divided by a screen, then subjected to added air, plus a further breaking up, after the air has been added, by another screen or barriers and then released. The application, as plaintiff admits, had "a stormy time in the Patent Office" and was first denied on various references, but eventually allowed by the Board of Appeals.

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1. A device for producing a coherent jet of water containing air bubbles, comprising a chamber, the inlet end of which is adapted for connection with the discharge end of a tube containing water under pressure and the outlet end of which is adapted to discharge the said coherent jet, a diaphragm at the upstream end of the chamber having at least one orifice through which the stream of water is adapted to be forced into the chamber with substantial velocity, an air port opening into the chamber through which air is induced by the stream of water, and means, in the path of the stream of water after it leaves the orifice and before it discharges at the outlet end, for finely breaking up the water and for offering sufficient resistance for thoroughly mixing it with air and for thereafter uniting the aerated water to form a coherent jet having small bubbles disseminated throughout the jet.

The District Judge heard the testimony of the plaintiff, his expert and Mr. Goodrie, one of the defendants, received certain documentary evidence and observed certain tests of the patented, the allegedly infringing and other devices in open court, participated in by both parties. He had before him evidence bearing upon alleged commercial success and various references to the prior art. At the conclusion of the trial, he took the cause under advisement, giving the parties the privilege of filing written briefs and argument, the time for filing which was extended at various times. Finally, when they were all in, the judge, on November 3, 1952, announced his decision, saying: "In my opinion the Aghnides patent Number 2,210,846 upon which plaintiff relies in this case is anticipated by British patents Number 6012 of 1909 and 405316 of 1933 and is therefore invalid. Counsel may prepare findings of fact and conclusions of law and submit them to Casper W. Ooms as Special Master in this case for the purpose of passing on such findings and conclusions."

Following the Special Master's report on March 20, 1953, the court entered formal findings and conclusions, in which, after discussing the details of the patent, pointing out the salient elements of the prior art and describing the tests performed in open court, it found that all the elements of Aghnides were old in the art in the Felten British patent No. 6012 of 1909, its counterpart, No. 1090044 to Fuss 1914, and Solomon British patent No. 405,316 of 1933; that Aghnides' assembly of old elements performs no new or additional function, and achieves no new or unusual or surprising result but that the devices of the prior patents to Solomon and Felten achieved substantially the same results and that to produce the disclosure of the patent required no invention. The court concluded that the claims were anticipated by Felten and Solomon and were invalid

because of such anticipation and because of lack of invention.

At the outset we are met with plaintiff's contention that the findings are not entitled to the proverbial weight to be given trial court findings under Rule 52(a) of the Rules of Civil Procedure. He attacks only those heretofore summarized, insisting that they were proposed by the Master, who, though he had examined the oral and documentary evidence, did not see the tests performed in open court and that they were therefore wrongfully adopted by the court, after a protracted interval had intervened between the conclusion of the trial and the date of the entry of the findings. He argues that the court had forgotten the facts, and merely accepted the Master's proposals, which did not take into consideration the tests which the court had observed.

At the conclusion of the trial, November 15, 1951, both parties waived oral argument. After various extensions of time, plaintiff filed its brief and argument on May 22, 1952; thereafter defendants filed their brief and argument and plaintiff filed his reply brief. In September, 1952, Judge Holly suggested that, as he had been ill during the summer and unable to work on his decision, perhaps the parties would desire to have the case assigned to another judge. Counsel for both parties consulted and agreed that the case should remain with Judge Holly for decision. Consequently, with the consent of both parties, Judge Holly retained the case and finally, on November 2, 1952, entered the findings hereinbefore summarized that the patent in suit was anticipated and was invalid. At the same time he directed that both parties submit suggested formal findings to Casper W. Ooms, an erudite and experienced patent attorney and former Commissioner of Patents, as Special Master, to be considered by him. The formal findings and conclusions and judgment dismissing the suit were entered March 20, 1953. Denying a motion for new

trial on April 10, 1953, the court said that the findings were not affected by his illness in the summer of 1952 and that the motion for a rehearing was without merit.

The Master reported that there had been a dispute before him only as to findings 9 and 13 inclusive; that he had examined the evidence and that the findings suggested were based thereon and not upon the tests in open court and that he submitted them for such action as the court might consider proper upon the whole record. The Master did not make findings on the merits but explicitly stated that it was up to the court to do so, based upon the record and the court's knowledge of what had transpired at the trial. Of course, when the court entered the findings, they became its findings and not those of the Master; the latter's report was merely advisory; the court made the final determination. Furtherfore the formal findings adopted were in strict conformity with the court's decision before it asked the parties to suggest more formal findings and conclusions.

Under these circumstances, we find no justification for lending to the trial court's findings any less weight than we normally do under Rule 52(a). Consequently our question is the usual one of whether there is adequate evidence to support them. Such cases as *Sales Affiliates* v. *National Mineral Co.*, 172 F. 2d 608; *Falkenberg* v. *Golding*, 195 F. 2d 483 and *Chas. Peckat Mfg. Co.* v. *Jacobs*, 178 F. 2d 794, decided by this court, wherein we were dealing with records made up of documentary evidence, which we were as capable of interpreting as was the district court are not applicable here. The present case comes more clearly within our decision in *National Rejectors* v. *A. B. T. Mfg. Corp.*, 184 F. 2d 612, where we said at 615:

> "In view of the fact that the court, having seen the devices demonstrated and heard the witnesses, expert and otherwise, of each of the parties, having their conflicting testimony before it, made a finding which

has adequate substantiation in the record, under the federal rules of procedure, we have no right to interfere. *Graver Tank & Mfg. Co.* v. *Linde Air Products Co.*, 336 U. S. 271, 69 S. Ct. 535, 93 L. Ed. 672; *Hazeltine Research Inc.* v. *Admiral Corp.*, 7 Cir., 183 F. 2d 953."

We, too, have had the benefit of tests in open court at the time of the argument before us. We, too, have the transcript of the oral and documentary evidence. After careful consideration of all that has been presented, we think the trial court was amply justified in entering the findings and conclusions of which complaint is made. Indeed, we are of the opinion that any determination to the contrary would have been erroneous.

Felten is prior art. He designated his invention as "improvements in or relating to Mixing Devices" and as a "Mixing device for producing * * mixtures from a gas or vapor like substance and a liquid substance," and an "apparatus for mixing gases with fluids." The patent in suit uses similar language. "This invention relates to a device for intimately mixing a gas with a liquid." Felten introduced ozone into water under pressure and mixed them. Aghnides introduced into water under pressure and mixed them. Each called his process one for mixing a gas with a fluid. Felten reads literally on the claims of Aghnides. An asserted difference is that the mixing chamber of Aghnides is larger than that of Felten, but that, so far as the tests and the evidence shows, is not an inventive difference. Then, too, plaintiff insists that the air vent of Felten introducing air into the mixing chamber does not in fact lead into the chamber but only into the top thereof, thus weakening the mixing effect. Yet in both Felten and Aghnides, the vent enters the chamber just below the diaphragm, which in turn, is just below the intake for the water. Felten as well as Aghnides brings the gas into the mixing chamber. If in practice, it has proved

desirable to introduce the gas at a point lower than that indicated by either, that lower placement cannot amount to invention. The important thing is that each introduces a vapor, a gas, ozone or air, into moving water in order to mix the two substances. It seems to us utterly immaterial that Felten's apparatus may also be used as a vacuum pump; so indeed may one form of Aghnides. Element for element, the two are the same. In tests the two accomplish the same results, though perhaps not with equal efficiency. We conclude then that the trial court rightfully found that Felten anticipated Aghnides and taught the latter all that he needed to know in order to build his mixer of gas and fluid, i. e., air and water.

We think it unnecessary to prolong this opinion by detailed discussion of other prior art. Suffice it to say that in our opinion, after carefully examining it, the teachings of the other patents in evidence were such that, with them before him, Aghnides did not achieve invention.

If for the moment we indulge the presumption of validity, we think Aghnides' claims must be very narrowly construed and limited to the specific structure disclosed by him. Consequently, defendants, who do not employ the same structure, but prescribe a different means for separating the incoming water into jets, does not infringe.

We conclude that Aghnides was anticipated; that, if not fully anticipated, the prior art, of which he was bound to take notice, was such that any skilled delver in the art of mixing gases and fluids could have built Aghnides' device,—in other words, that he did not achieve invention but accomplish the result of a skilled mechanic.

In view of our conclusions we consider it unnecessary to extend this discussion to other points urged by the respective parties.

The judgment is

AFFIRMED.

APPENDIX C.

IN THE UNITED STATES COURT OF APPEALS
For the Seventh Circuit.

No. 11405. OCTOBER TERM AND SESSION, 1955.

ELIE P. AGHNIDES and CHASE BRASS AND COPPER COMPANY, INC.,
Plaintiffs-Appellants,
vs.
ORLOFF W. HOLDEN and MARGUERITE HOLDEN, doing business as KNICKERBOCKER RUBBER COMPANY,
Defendants-Appelees.

Appeal from the District Court of the United States for the Northern District of Illinois, Eastern Division.

November 3, 1955.

Before MAJOR, LINDLEY and SCHNACKENBERG, *Circuit Judges.*

LINDLEY, *Circuit Judge.* On July 19, 1950, plaintiffs filed a complaint in the district court against defendants, charging them with infringement of the patent to Aghnides, number 2,210,846. Issue was joined and the cause remained in *status quo* until the decision of this court on February 24, 1954, in *Aghnides* v. *Goodrie,* 210 F. 2d 859, wherein plaintiff Aghnides had sued other defendants for infringement of the same patent. In that case the district court had held each of the claims, five in number, invalid and, upon appeal, we affirmed the judgment. Following this decision, the defendants on November 4, 1954, in the suit

at bar then pending, filed a motion for summary judgment setting up the findings, conclusions and judgment of the district court and the decision of this court in the former case, claiming that there remained no genuine issue as to any material fact and that under Rule 56 of the Federal Rules of Civil Procedure, 28 U. S. C. A., they were entitled to judgment as a matter of law.

Plaintiffs filed an affidavit of the patentee in which he stated that he had made a new model of the prior art Felten device which we had held in the *Goodrie* case anticipated the patent in suit. He averred that he was prepared to conduct new tests and produce new evidence and show that the prior art Felten device did not accomplish the same results or have the same mode of operation as that of the patent in suit; that he was prepared to show by new and different models and tests of the prior art that the elements of the patented device are not old and do not perform the same functions as they performed in the prior art devices; and that, element for element, Felten and Aghnides are not the same and do not accomplish the same results. The trial court held that the suggested new evidence was not fairly distinguishable from the evidence in the *Goodrie* case, our decision in which established the invalidity of the plaintiffs' patent, and that, as a matter of law, defendants were entitled to judgment. This appeal followed.

Defendants argue that the affidavit of Aghnides is general and not specific; that it discloses merely a desire to relitigate the validity of the patent by producing new models and such evidence as will convince the district court that the decision in the former case was wrong. In this connection, it is obvious we think, that the affidavit is general and, in the ordinary case, would not constitute a sufficient showing of a genuine issue as to any material fact. But, in our opinion, this is immaterial under the facts of the present case.

This suit was pending at the time of our former decisions. It was against other alleged infringers who are not shown to be identified in any wise with the defendants in the former case, or in privity with them. It would seem axiomatic therefore, that the rules of *res adjudicata* do not apply and, indeed, defendants do not insist that they do. Nor can it be said that our decision in the former case is the law of this circuit to the extent that it is decisive in other cases for infringement against other defendants. Plaintiffs have a right, if they desire, to litigate as against other defendants and not until and unless it appears by the evidence submitted at the trial that it does not differ essentially from the evidence submitted in the former case, will the decision in the first case become the law of the present one. Thus, in *Triplett* v. *Lowell*, 297 U. S. 638, at 642-644, the Supreme Court said: "Neither reason nor authority supports the contention that an adjudication adverse to • • • the claims of a patent precludes another suit upon the same claims against a different defendant. While the earlier decision may by comity be given great weight in a later litigation and thus persuade the court to render a like decree, it is not *res adjudicata* and may not be pleaded as a defense. See *Mast, Foos & Co.* v. *Stover Mfg. Co.*, 177 U. S. 485; *Sanitary Refrigerator Co.* v. *Winters*, 280 U. S. 30, 35. • • • neither the rules of the common law applicable to successive litigations concerning the same subject matter, nor the disclaimer statute, precludes relitigation of the validity of a patent claim previously held invalid in a suit against a different defendant." It continued at 648: "The fact that the suit was brought in the same circuit where the court of appeals had previously held some of the claims invalid is immaterial, for the court must decide whether the issues of law and fact in the two cases are the same, and if they are not it is not bound by the earlier decision."

A case similar to the one before us is *Gold Seal Importers, Inc.* v. *Westerman-Rosenberg, Inc.*, 133 F. 2d 192 (CA-2). There, by amended answer, the defendant averred that the patent had been held invalid by the Court of Appeals in the case of *Gold Seal Importers* v. *Morris White Fashions*, 124 F. 2d 141 (CA-2), and moved for judgment on the pleadings. There, too, the district court granted the motion merely because the validity of the patent had been decided adversely to the plaintiff in the former case. The judgment was reversed. The court said at pages 192-193: "* * * obviously that decision cannot be pleaded as *res judicata* in a suit against a different infringer not in privity with Morris White Fashions. Nor is it a precedent which the district court was bound to follow, unless the evidence pertinent to the issue of validity is the same in both cases. *Smith* v. *Hall*, 301 U. S. 216, 218, 57 S. Ct. 711, 81 L. Ed. 1049; *Lektophone Corp.* v. *Miller Bros.*, D. C. Del., 37 F. 2d 580, 581; *Minerals Separation* v. *Butte & Superior Copper Co.*, D. C. Mont., 237 F. 401, 402."

Of course it is desirable that there should be an end to litigation. But this beneficent result cannot be attained at the expense of depriving plaintiffs of the right to show, if they can, that, as against defendants who have not previously been in court, the patent is valid and infringed.

The judgment is reversed and the cause remanded to the district court for further proceedings consistent with this opinion.

SCHNACKENBERG, *Circuit Judge*, concurring. I believe that Judge Lindley has correctly applied the law, in its existing state, to the case before us. While the counter-affidavit of Aghnides is defective, I believe that it is superfluous and that he is entitled under existing law to another day in court where he may relitigate the same issue upon which he lost in the *Goodrie* case. The law does not require

him to justify this indulgence. He is entitled to it because a suit testing the validity of a patent is not a proceeding *in rem* and hence Aghnides may litigate and relitigate again and again the question of validity of his patent as long as he selects a different defendant in each of the infringement suits which he files, thus avoiding the wholesome doctrine of *res adjudicata*. This queer result is one which we are unable to avoid. It is a situation which is particularly abhorrent when considered against the backlog of untried cases which clogs our federal courts. The latter are cases where the litigant asks only for his day in court, not a plurality of days in court as Aghnides is entitled to under the existing law. The remedy lies not in our hands. The congress could by legislation grant relief.

APPENDIX D.

35 U. S. C. §102.

The pertinent portion of 35 U. S. C. §102, 66 Stat. 797 (R. S. 4886 and 4887), is as follows:

§102. Conditions for patentability; novelty and loss of right to patent.

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

• • • • •

(d) the invention was first patented or caused to be patented by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or

• • • • •

APPENDIX D.

INTERNATIONAL PATENT CONVENTION.

The pertinent portion of the International Patent Convention, 53 Stat. 1748, is as follows:

(53 Stat. 1748)

June 2, 1934
(T. S. No. 941)

Convention between the United States of America and other powers for the protection of industrial property, revising the Paris convention of March 20, 1883, revised at Brussels on December 14, 1900, at Washington on June 2, 1911, and at The Hague on November 6, 1925. Signed at London June 2, 1934; ratification advised by the Senate June 5, 1935; ratified by the President June 27, 1935; ratification of the United States of America deposited at London July 12, 1935; proclaimed October 28, 1938.

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA.

A PROCLAMATION.

Multilateral convention for the protection of industrial property. Preamble. 25 Stat. 1372; 32 Stat. 1936; 38 Stat. 1655; 47 Stat. 1789.

WHEREAS a convention revising the convention for the protection of industrial property signed at Paris on March 20, 1883, revised at Brussels on December 14, 1900, at Washington on June 2, 1911, and at The Hague on November 6, 1925, was signed by the respective plenipotentiaries of the United States of America and certain other countries at London on June 2, 1934, which convention in the French language is word for word as follows:[1]

* * * * * *

[1] NOTE. For English translation see p. 1768.

(53 Stat. 1768)

[Translation.]

CONVENTION OF UNION OF PARIS OF MARCH 20, 1883, FOR THE PROTECTION OF INDUSTRIAL PROPERTY, REVISED AT BRUSSELS DECEMBER 14, 1900, AT WASHINGTON JUNE 2, 1911, AT THE HAGUE NOVEMBER 6, 1925, AND AT LONDON JUNE 2, 1934.

Contracting powers

The President of the German Reich; the President of the Republic of Austria; His Majesty the King of the Belgians; the President of the United States of Brazil; the President of the Republic of Cuba; His Majesty the King of Denmark; the President of the Republic of Spain; the President of the United States of America; the President of the Republic of Finland; the President of the French Republic; His Majesty the King of Great Britain and Ireland and of the British Territories Beyond the Seas, Emperor of India; His Most Serene Highness the Regent of the Kingdom of Hungary; His Majesty the King of Italy; His Majesty the Emperor of Japan; His Most Serene Highness the Prince of Liechtenstein; His Majesty the Sultan of Morocco; the President of the United Mexican States; His Majesty the King of Norway; Her Majesty the Queen of the Netherlands; the President of the Polish Republic (in the name of Poland and the Free City of Danzig); the President of the Portuguese Republic; His Majesty the King of Sweden; the Federal Council of the Swiss Confederation; the President of the Czechoslovak Republic; His Highness the Bey of Tunisia; the President of the Turkish Republic; His Majesty the King of Yugoslavia,

Having deemed it expedient to make certain modifications and additions in the International Convention of March 20, 1883, for the creation of an International Union 25 Stat. 1372.

32 Stat. 1936, 38 Stat. 1645; 47 Stat. 1789.

for the Protection of Industrial Property, revised at Brussels on December 14, 1900, at Washington on June 2, 1911, and at The Hague on November 6, 1925, have appointed as their plenipotentiaries, to wit:

Plenipotentiaries

* * * * *

(53 Stat. 1772)

Who, having communicated their respective full powers, which were found to be in good and due form, have agreed upon the following provisions:

ARTICLE 1.

Union constituted.

(1) The countries to which the present convention applies constitute themselves into a Union for the Protection of Industrial Property.

Scope.

(2) The scope of the protection of industrial property shall include patents, utility models, industrial designs and models, trade marks, commercial names and indications of origin, or appellations of origin, as well as the repression of unfair competition.

* * * * *

Patents

(4) The term "patents" shall extend to the various types of industrial patents recognized by the laws of the countries of the Union, such as patents of importation, improvement patents, patents and certificates of addition, etc.

ARTICLE 2.

Mutual protection of industrial property.

(1) Nationals of each of the countries of the Union shall, in all other countries of the Union, as regards the protection of industrial property, enjoy the advantages that their respective laws now grant, or may hereafter grant, to their own nationals, without any prejudice to the rights specially provided for by the present convention.

Protection against infringement of rights.

Consequently they shall have the same protection as the latter, and the same legal remedy against any infringement of their rights, provided they observe the conditions and formalities imposed upon nationals.

* * * * *

(3) The provisions of the legislation of each of the countries of the Union relative to judicial and administrative proceedings and to competent authority, as well as to the choice of domicile or the appointment of an authorized agent, which may be required by the laws on industrial property are expressly reserved. Reservation.

* * * * *

ARTICLE 4.

A. (1) Any person who has duly applied for a patent, the registration of a utility model, industrial design or model, or trade mark in one of the countries of the Right of priority.

(53 Stat. 1773)

Union, or his legal representative or assignee, shall enjoy for the purposes of registration in other countries a right of priority during the periods hereinafter stated.

(2) Any filing having the value of a formal national filing by virtue of the internal law of each country of the Union or of international treaties concluded among several countries of the Union shall be recognized as giving rise to a right of priority. Formal national filing; recognition.

B. Consequently, subsequent filing in one of the other countries of the Union before the expiration of these periods shall not be invalidated through any acts accomplished in the interval, as, for instance, by another filing, by publication of the invention or the working thereof, by the sale of copies of the design or model, or by use of the trade mark, and these facts cannot give rise to any right Effect.

Third parties, etc.

of third parties or any personal possession. The rights acquired by third parties before the day of the first application on which priority is based shall be reserved by the internal legislation of each country of the Union.

Periods of priority.

C. (1) The above-mentioned periods of priority shall be 12 months for patents and utility models and 6 months for industrial designs and models and for trade marks.

(2) These periods shall start from the date of filing of the first application; the day of filing is not counted in this period.

* * * * *

Declaration of particulars required.

D. (1) Any person desiring to take advantage of the priority of a previous application must make a declaration giving particulars as to the date of such application and the country in which it was made. Each country will determine the latest date at which such declaration must be made.

Statement of particulars.

(2) The particulars referred to shall be stated in the publications issued by the competent authority, and in particular in the patents issued and the specifications relating thereto.

Production of certified copy of prior application.

(3) The countries of the Union may require any person making a declaration of priority to produce a copy of the application (with the specification, drawings, etc.) previously made. The copy, certified as correct by the authority receiving this application, shall not require legal authentication, and in all cases it can be filed, without fee, at any time within the period of 3 months from the filing of the application. They may also require that the declaration later be accompanied by a certificate by the proper authority showing the date of application, and also by a translation.

Further formalities unnecessary.

(4) No other formalities may be required for the declaration of priority at the time application is filed. Each

of the countries of the Union shall decide upon the consequences of the omission of the formalities prescribed by this article, but such consequences shall in no case exceed the loss of the right of priority.

(5) Further proof in support of the application may be required later. **Further proof.**

(53 Stat. 1774)

• • • • •

H. Priority cannot be refused on the ground that certain elements of the invention for which priority is claimed do not appear among the claims made in the application in the country of origin, provided that the application, as a whole, discloses precisely the aforesaid elements. **Priority not to be refused because of absence of certain elements in application.**

ARTICLE 4 *bis*.

(1) Patents applied for in the various countries of the Union by persons entitled to the benefits of the Union shall be independent of the patents obtained for the same invention in other countries, whether or not such countries be parties to the Union. **Independence of patents applied for.**

(2) This stipulation must receive a strict interpretation; in particular, it shall be understood to mean that patents applied for during the period of priority are independent, both as regards the grounds for refusal and revocation and as regards their normal duration.

(3) This stipulation shall apply to all patents already existing at the time when it shall come into effect.

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IN THE

Supreme Court of the United States

OCTOBER TERM, 1957.

No. 508

S. H. KRESS & COMPANY,
Petitioner,

vs.

ELIE P. AGHNIDES AND CHASE BRASS & COPPER CO., INC.,
Respondents.

REPLY BRIEF OF PETITIONER IN SUPPORT OF PETITION FOR WRIT OF CERTIORARI.

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Respondents' Brief opposing the Petition for Certiorari raises a number of specific questions that are herewith answered as follows:

THE RECENT DISMISSALS OF PENDING CASES.

Respondents' Brief now advises that **after** the filing of this Petition for Writ of Certiorari on September 27, 1957, certain cases involving the subject patent were dismissed by Respondents on October 14, 1957 and October 17, 1957.

Two important reasons stated in support of the Petition for Certiorari were (1) the conflict of Opinions between the Seventh and Fourth Circuits, and (2) the existence of a substantial amount of pending litigation, now thrown into a state of confusion by the conflict of Opinions.

Although the two dismissed cases had, heretofore, involved considerable Court action,[1] the said dismissals were **with prejudice**, despite the fact that Respondents had successfully sustained the validity of the patent in the Fourth Circuit.

In view of Respondents' opposition to this Petition, we submit that the dismissals **with prejudice** were intended solely for the purpose of arguing to this Court against the granting of this Petition.

We believe that the importance of this Court's resolving the conflict in Opinions of Circuit Courts of Appeals remains unaffected by Respondents' actions which took place **subsequent** to the filing of the Petition herein.

THE QUESTIONS OF GREAT PUBLIC IMPORTANCE RELATING TO FRAUD, OR TO THE MISUSE OF THE PATENT UNDER THE INTERNATIONAL PATENT CONVENTION.

The facts and law which support Petitioner's charges of fraud and misuse of the patent have been fully examined in Petitioner's Main Brief, at pp. 10 to 17. The Respondents' argument opposing the grant of Certiorari on these questions requires some brief comment.

(a) In attempting to avoid the impact of the case of *Keystone-Driller Co.* v. *General Excavator Co.*, 290 U. S. 240, 244; 54 S. Ct. 146, 147, on Aghnides' false pre-trial testimony, Respondents argue that Aghnides' false testimony "was simply a natural mistake" (Respondents' Brief, p. 7). By this admission, that Aghnides' testimony was not correct, the Respondents now confirm that the District Court Judge's Denial (1 App. 89-93), of Kress' Mo-

1. *Aghnides et al.* v. *Holden et al.*, 226 F. 2d 949 (Appendix C in the Petition—pages xxvi to xxx).
Marshall Metal Products, Inc. et al. v. *Aghnides*, 126 F. Supp. 850; (Also see 126 F. Supp. 849 and a related case at 117 F. Supp. 839).

tion to Reopen the trial of the case, was predicated upon the Judge's erroneous understanding (1 App. 90) of Aghnides' deposition testimony. The fact is that Aghnides' untruth (or "natural mistake" as referred to by Respondents) **did** operate to "cover up" and prevent further inquiry into the true facts.[2]

(b) Respondents do not now deny that Aghnides has made **contradictory** statements in the United States and Canada, but seek to explain away such contradictions as being "made by his solicitors" (Respondents' Brief, p. 9). However, a patentee may not avoid the consequences of his representations simply because they were made through an attorney or solicitor.[3]

(c) With respect to the issue arising under the International Patent Convention, which issue is one of first impression before this Court, the Petition alleges that the patent in suit is unenforceable because either Aghnides' United States patent was procured by fraud under the Convention, or was thereafter used to perpetrate a fraud on Canada. In response to that charge, Respondents argue that no fraud was perpetrated in Canada and say (Respondents' Brief, page 10):

> "* * * All of the information needed to determine the relationship and effect of the several Aghnides ap-

---

2. See footnote No. 9 on page 10 of Petitioner's Main Brief.

3. That type of argument was best answered by Judge Learned Hand in the case of *Sarazin, et al.* v. *Wright Aeronautical Corp.*, 162 F. 2d 960 (affirming 54 F. Supp. 244, referred to in footnote No. 10 on page 12 of the Petition), for when counsel in the *Sarazin et al.* case sought to explain away critical admissions made in a foreign patent, the Second Circuit Court rejected such argument and stated, at page 963:

> "* * * Sarazin's attorneys now answer that the language may have been that of his French attorneys, not his own, because he did not sign the application. This evasion was cannot accept: the notion that attorneys should have volunteered so to discredit their client's earlier patents is important only for its hardihood."

plications was before the Canadian Patent Office, including the fact that the United States application claimed the priority of the Belgian application."

However, what Respondents fail to tell this Court is that Aghnides also told the Canadian Patent Office (1) that the Belgian convention date shown on the United States patent was **in error**; (2) that the Belgian application **did not** disclose the invention disclosed in the United States patent; (3) that the ways and means of achieving the invention was first disclosed in the United States in 1937, and **not** in Belgium in 1934. Each of these statements to the Canadian Patent Office is in direct contradiction to the Findings of Fact and the Opinion of the Fourth Circuit Court in this case, and hence are, apparently, untrue.

Thus, the Respondents' position may be summed up as: the false pretrial testimony concerning the Canadian patent was "a natural mistake"; the statements in the Canadian application, which are direct contradictions of what has been said in the United States, were "made by his solicitors"; and the statements in Canada, which are in complete conflict with the Opinion of the Fourth Circuit, and which apparently are untrue, fail to constitute a fraud.

We submit that Respondents' position is wholly without substance in fact or law, and that all of the foregoing constitutes gross fraud of the type which has been roundly condemned by this Court.

THE QUESTION OF CONFLICT BETWEEN COURTS OF APPEALS.

The Seventh Circuit found patent 2,210,846 invalid in view of the Felten British patent. The Fourth Circuit found patent 2,210,846 to be valid over the same Felten British patent. The same patent and the same prior art is involved in both Opinions. The Opinions are in direct conflict on this same basic set of facts.

Obviously in any two cases tried at different times, certain of the underlying facts will be different. But that is immaterial here, where the **ultimate** finding of fact and conclusion of two Courts of Appeals are in **direct conflict.**

The Petitioners do not deny that the Fourth Circuit's ultimate conclusion re Figure 8 is in conflict with the rule of patent law that has been consistently reiterated by the Court of Customs and Patent Appeals in many patent cases (see Petition, pages 21-22). On this point, Petitioners argue that the fact situations in the CCPA cases are different (Respondents' Brief, p. 16 and footnote). But that is irrelevant, as the conflict relied upon is the **conflict in law** between the Fourth Circuit's opinion and the prior CCPA decisions.

We further call this Court's attention to the fact that in the case of *Aghnides* v. *Goodrie et al.*, No. 160 in the 1954 term of the U. S. Supreme Court, where the same 2,210,846 patent was involved, the Respondent, Aghnides, was there the petitioner, and sought certiorari on the basis of conflict between the Seventh Circuit's Opinion and the Opinion of Judge Hayes of the District Court of the Middle District of North Carolina. In this case the decision below is also by Judge Hayes of the North Carolina District Court, and has now been affirmed by the Fourth Circuit Court. It hardly lies for the Respondent Aghnides to have urged conflict before this Court in 1954 and to deny conflict today.

CONCLUSION.

We submit that the conflict of Circuit Court Opinions, and the public importance of the issue arising under the International Patent Convention, a treaty, and being a question of first impression, requires the grant of this Petition for Writ of Certiorari.

Respectfully submitted,

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October 28, 1957.

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In the Supreme Court of the United States

OCTOBER TERM, 1957.

No. 508.

S. H. KRESS & COMPANY,

Petitioner,

vs.

ELIE P. AGHNIDES and CHASE BRASS & COPPER CO., INC.,

Respondents.

RESPONDENTS' BRIEF OPPOSING PETITION FOR CERTIORARI.

JURISDICTION.

No actual basis now exists for invoking this Court's jurisdiction relative to the pendency of substantial litigation in the Second and Fourth Circuits involving the Aghnides patent 2,210,846. Since the patent has expired, the *Marshall Metal Products v. Aghnides* case, Civil Action 85-272 in the District Court for the Southern District of New York, has been dismissed with prejudice by the Court October 14, 1957, and the *Aghnides v. Holden et al.* case, Civil Action 50 C 1022 in the District Court for Northern Illinois, Eastern Division, has been dismissed with prejudice by the Court October 17, 1957. The *Melard Mfg. Corp. v. Aghnides* case in the District Court for the Southern District of New York, Civil Action 93-355, and *Melard Mfg. Corp. v. Chase et al.*, Civil Action 55 C 84 in the District Court for Northern Illinois, Eastern Division,

involve the same parties or their privies and the same patent as the present case,* and as to those parties the question of validity of said patent is *res adjudicata*.

There is no issue in this case involving the International Patent Convention, and hence no international treaty issue which this Court need determine, as will be readily apparent from a true appraisal of the accepted facts.

RESPONDENTS' STATEMENT OF QUESTIONS PRESENTED.

I. Where the trial judge, long after conclusion of the trial, denies a motion to reopen on the ground (for which there was no basis in the record), that plaintiff had made representations in the Canadian Patent Office allegedly contrary to representations in the U. S. Patent Office fully supported by the trial record, and the Court of Appeals in affirming the denial of the motion independently considers the merits of the matter on which the motion is based, should the Supreme Court grant certiorari to determine whether the motion to reopen was properly denied?

II. Is there a conflict of decisions with respect to validity of a patent in the Seventh and Fourth Circuits requiring determination by the Supreme Court, where the Fourth Circuit has specifically pointed out that their decision was based on a different and later record containing new visual evidence disproving the conclusions drawn by the Court in the Seventh Circuit, and where the patent involved is now expired and the only litiga-

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* The District Court held (1 App. 104) that Melard conducted the defense and was bound by the judgment against Kress. This finding was not appealed to the Court of Appeals for the Fourth Circuit.

tion still pending involving said patent is between the same parties as in the Fourth Circuit case, or their privies?

The collateral question relating to Figure 8 of the patent attempted to be presented by petitioner is a question which need not be determined by this Court, since petitioner's contention on this question was the specific subject of a petition for rehearing which was denied with opinion by the Court of Appeals below.

STATEMENT OF FACTS.

Petitioner's "Statement of Facts" relevant to question I contains misleading statements and unfounded conclusions. Aghnides' original specification (2 App. 50) * of his December 31, 1937 patent application, which resulted in U. S. patent 2,210,846, stated that "this application is a continuation in part of my earlier application Serial No. 52,923, filed December 4, 1935," which corresponded to the Belgian application. The original oath of the 1937 application stated that the annexed specification discloses and claims "**certain matters**** derived from an earlier application filed by him on December 4, 1935, Serial No. 52,923." The Aghnides British patent was cited later by the U. S. Patent Office (2 App. 71), and in response Aghnides called attention to the fact that the specification of his 1937 application set forth that it was "a continuation in part of my earlier application Serial No. 42,923" and pointed out that the British patent was therefore not a proper reference since it corresponded to the earlier appli-

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* "1 App. ___" and "2 App. ___" refer to Volumes I and II, respectively, of Appellant's Appendix before the Court of Appeals of the Fourth Circuit. "PA ___" refers to Appellee's Appendix before that Court. "Appendix ___ page ___" refers to the appendices printed at the end of Appellant's Petition for Certiorari.

** Emphasis supplied.

cation. The British patent was not reasserted by the U. S. Patent Office.

Thus, there is no factual foundation here for petitioner's conclusion that the British patent "would have been insurmountable opposition to the issuance of a patent."

Petitioner's Statement of Facts relevant to Question II is incomplete to say the least. Finding XXVII(f) of the District Court below, which the Court of Appeals held was fully supported by the evidence, refers to the Felten's specification, as follows:

> "Not only was it demonstrated that Felten's result is different but that he secures his result by different elements and by a different mode of operation. The patent states that the result is secured by means of a 'conically widening chamber e, the widening of which produces in a well known manner the suction of the gas from the perforation d owing to the flow of the liquid from the perforation c into the widened chamber e.' (Felten Patent, p. 1, line 28). This has no counterpart in Aghnides. Felten, to secure his result, must keep the chamber flooded—the exact opposite of Aghnides. * * *" (Appendix A, p. vi.)

Petitioner's statement that the U. S. Fuss patent shows Felten's mixing device mounted at the discharge end of an ordinary home faucet should be completed by pointing out that the suction inlet to the device is connected to a closed chamber for creating a partial vacuum therein (2 App. 304).

Petitioner's statement, that tests of a Felten device before the Trial Court showed that it delivered a non-splash bubbly stream of air and water, ignores the observations of the District Court below based on the tests (1 App. 98):

"Felten as shown above did not produce aerated water. He did not seek that result. He was endeavoring to provide a vacuum pump. This necessitated the flooding of the chamber to create vacuum, the exact opposite of Aghnides Patents in suit. He did not obtain aerated water, nor a coherent, splashless stream. There is nothing in Felten to indicate he was concerned at all in these results. This applies to Aghnides 1,912,113, and to Fuss Patent 1,090,044."

Petitioner's statement, that the holding of the Fourth Circuit Court of Appeals that Figure 8 of patent 2,210,846 is outside the scope of the claims is in direct conflict with the Opinion of the Court of Appeals for the Seventh Circuit, is not correct. The Seventh Circuit held that Felten (not Figure 8) reads literally on the claims, and that one form of Aghnides may be used as a vacuum pump.

ARGUMENT.

I. The Alleged Patent Misuse or Fraud Under the International Patent Convention.

The so-called issue of patent misuse, or fraud, is not an issue under the International Patent Convention because while Aghnides claimed the priority date of his Belgian patent in the United States he could not and did not claim it in Canada. His Canadian application was filed five years after the filing date of his Belgian application, so that the Convention did not apply.

This issue was not tried below but was the subject of a motion, filed by petitioner almost two months after the evidence was closed by both sides, to reopen the case in the District Court. The District Judge denied the motion, citing *Marconi Wireless Co. v. U. S.*, 320 U. S. 1, 47, 48, as authority for the decision being within his sound discretion, and held in effect that there was no fraud.

The Court of Appeals for the Fourth Circuit gave the matter special consideration and held (Appendix A, pp. xii-xiii):

> "In this case, we are the more strongly disinclined to interfere with Judge Hayes' exercise of discretion, because on the documents before us, we fully agree with his comment that **even if the case were reopened, the proffered testimony would not alter the result.** From our own examination of the United States patent '846 and the Belgian patent, **we think it unquestionably true that they are, as Aghnides told the United States Patent Office, the same invention.** Whether or not on another occasion Aghnides made an inconsistent claim in Canada to obtain a patent there, is an issue that we need not decide. If he made a misstatement there, this might bear upon the validity of his Canadian patent. It would not alter the fact that what he told the United States Patent Office was the truth and that the patent here was obtained without deception or fraud." (Emphasis added.)

(1) The contention that Aghnides falsified to the U. S. Patent Office is completely answered by the fact that the U. S. Patent Office decided that Aghnides was entitled to the Belgian priority, and both the Courts below concurred. At the trial in the District Court a model constructed exactly in accordance with Fig. 1 of the Belgian patent was demonstrated to perform precisely the same as a model constructed in accordance with patent No. 2,210,846.

(2) In *Precision Instrument Mfg. Co. v. Automotive*, 324 U. S. 806, the District Court in the exercise of its discretion found gross and manifest fraud, and the Supreme Court sustained the District Court. Here the Supreme Court is asked to reverse the finding of no fraud by the

District Court in the exercise of its discretion, which finding was sustained by the Court of Appeals.

In the words of the District Court below, the belated motion to reopen the case on the ground of newly discovered evidence had for its main purpose "to produce evidence of statements made by Aghnides to the Canadian Patent Office and to impeach or contradict the evidence of Aghnides." (1 App. 92.) The District Court decided that the new evidence would not change his views. The Court of Appeals said specifically, "we fully agree with his comment that even if the case were reopened, the proffered testimony would not alter the result."

Similarly, in *Tracy v. Terminal R. Assoc.*, 170 F. 2d 635, 640 (C. A. 8, 1948), the Court held that newly discovered evidence must be of such weight and nature that if added to evidence already in the case it would probably change the result of trial. Again in *United States v. Bransen*, 142 F. 2d 232, 235 (C. A. 9, 1944) the Court held that allegedly newly discovered evidence which would not materially change the result and which is in a large part not newly discovered at all, is not ground for a new trial. This case also significantly held that the application will be denied where it appears that the degree of activity or diligence which led to the discovery of evidence after trial would have just as easily have produced the evidence, had it been exercised prior to trial. In *Miller v. Kentucky*, 40 F. (2d) 820, 822 (C. A. 6, 1930) the Court held that newly discovered evidence which tends merely to affect the weight and credibility of evidence in the case does not constitute proper basis for a new trial.

(3) The so-called false pre-trial testimony was simply a natural mistake of one who had many patent applications in many countries. There is no evidence that it was made to cover up or hide anything.

Petitioner had ample opportunity to examine Aghnides during the trial, and did in fact examine him at length on the subject of the Belgian patent at each of three trial sessions in the course of a period of a year.

The case of *Keystone Driller Co. v. General Excavator Co.*, 290 U. S. 240, 245, holds:

> "But courts of equity do not make the quality of suitors the test. They apply the maxim requiring clean hands only where some unconscionable act of one coming for relief has immediate and necessary relation to the equity that he seeks in respect of the matter in litigation. They do not close their doors because of plaintiff's misconduct, whatever its character, that has no relation to anything involved in the suit, but only for such violations of conscience as in some measure affect the equitable relations between the parties in respect of something brought before the court for adjudication."

In the present case the Court of Appeals for the Fourth Circuit gave special consideration to this matter of alleged fraud, and held in effect that Aghnides' statements in Canada had no **immediate and necessary relation** to the equitable relations between the parties in respect to the matter brought before the court for adjudication, to wit, the validity and infringement of U. S. Patent 2,210,846.

(4) There has been no **misuse** of the International Patent Convention to claim one date of invention in the U. S., and a different date in Canada. In the Canadian application the Convention was not used to claim priority based on the Belgian filing date.

Moreover, Article 4 *bis* of the International Patent Convention (Appendix D, page xxxvii) itself provides:

"(1) Patents applied for in the various countries of the Union by persons entitled to the benefits of the Union shall be independent of the patents obtained for the same invention in other countries, whether or not such countries be parties to the Union.

"(2) This stipulation must receive a strict interpretation; in particular, it shall be understood to mean that patents applied for during the period of priority are independent, both as regards the grounds for refusal and **revocation** and as regards their normal duration." (Emphasis added.)

The Fourth Circuit committed no error of law in declining to find Aghnides' representations in Canada, even if untrue, constituted such unclean hands as to disentitle him to the relief sought. They said that if he made a misstatement in Canada, such might bear upon the validity of his Canadian patent, but would not alter the fact that he told the U. S. Patent Office the truth, and that his U. S. patent was obtained without deception or fraud.

The Fourth Circuit decision is not in direct conflict with the rule of law of *Jungersen v. Baden et al.* (CA 2), 166 F. 2d 807, cited by the Petitioner. In that case the Court said that the inventor's appraisal in a foreign patent of his invention in the United States was important. There, the appraisal was also supported by the prior art, and there was no proof to the contrary. Here, the statements by Aghnides in his Canadian application were actually made by his solicitors in the course of argument to the Canadian Patent Office.

The case of *Sarazin et al. v. Wright Aeronautical Corp.*, 54 F. Supp. 244, 251, cited by petitioner, merely holds that statements in foreign applications may be received in evidence as admissions against interest.

Petitioner has attempted to inject the issue of an International treaty in this case by arguing that in some way the grant of Aghnides' U. S. patent provided the means to perpetrate a fraud on Canada. We fail to see how any treaty is involved, regardless of what Aghnides said in Canada. All of the information needed to determine the relationship and effect of the several Aghnides applications was before the Canadian Patent Office, including the fact that the U. S. application claimed the priority of the Belgian application. The effect of the Belgian patent upon the Canadian application was a matter for **independent** determination by the Canadian Patent Office. The weight given by the Canadian Patent Office to acts of the United States Patent Office in a corresponding application is again a matter within the sole discretion of the Canadian Patent Office.

Regardless of what was said by way of argument in the Canadian Patent Office, the facts before it were that in the corresponding U. S. application which had resulted in U. S. patent 2,210,846, priority based on the Belgian application was claimed under the Convention, and that claims conforming to the U. S. patent claims were being asserted in the Canadian application, where priority based on the Belgian application was not and could not be claimed because the Canadian filing date was five years after the Belgian filing date. The Canadian Patent Office had previously cited an Aghnides British patent which was the counterpart of the Belgian patent. If the Canadian Patent Office chose to ignore or disagree with the U. S. Patent Office as to the effect of the Belgian patent or its British counterpart on the claims being asserted in the Canadian application, that is clearly a matter for independent determination by the Canadian Patent Office.

Thus, Aghnides has done nothing in derogation to the intent and purpose of an international treaty; in the United States he has validly claimed priority of his Belgian patent under the International Patent Convention, and in Canada he has not claimed such priority; so that petitioner's attempt to inject into this case the obligations of the United States to support the "public welfare" purposes of international treaties has no substance.

II. The Conflict Between the Seventh and Fourth Circuits.

The case of *Universal Oil Co. v. Globe Oil Co.*, 322 U. S. 471, 473, cited by petitioner, holds that the Supreme Court will grant certiorari to resolve conflicting decisions between Circuit Courts of Appeals as to the same patent and upon substantially the *same set of facts.*

In the present case the Court of Appeals for the Fourth Circuit and the District Judge below gave careful consideration to the previous decision by the Court of Appeals for the Seventh Circuit, the District Judge observing that he felt constrained to follow the Seventh Circuit **if the evidence warranted it.** In their opinion (Appendix A, p. iii) the Fourth Circuit said that:

> "* * * to avoid unnecessary conflict between the Circuits, we deemed it our duty to address ourselves independently and with special care to an examination of the District Court's findings. Of course, our review is of the record made in the District Court below, which is **different** from the *Goodrie* record, and appears to be more detailed and comprehensive." (Emphasis supplied.)

This Court has held that a holding by a Court of Appeals with respect to patent validity is not binding in a later case even in the same circuit, if the record in the later case is different. *Triplett v. Lowell*, 297 U. S. 638.

The Court of Appeals for the Seventh Circuit predicated its decision essentially on the prior British Felten patent and said (Appendix B, page xxiv) that it had "the benefit of tests in open court." Those tests were necessarily crowded into part of the time permitted for an appellant's argument and were observed by the court only from the bench at a considerable distance. The tests in the Fourth Circuit were demonstrations of transparent and cut away models of the Felten and Aghnides devices constructed so that the Court could see what actually takes place inside the devices when they are operating, rather than having to reach conclusions based on the apparent results, as the Seventh Circuit was forced to do on the record before it.

By means of the new and different demonstrations in the Fourth Circuit, it was visually shown that the conclusions in the Seventh Circuit were contrary to fact (PA 96-100, 103-104, 107-111).

As stated by the Court of Appeals for the Fourth Circuit (Appendix A, page iii):

> "After a long trial and many experiments conducted in his presence in the courtroom, District Judge Hayes concluded that Felten operated on a different principle and did not achieve the result of Aghnides. One after another of the observations made in the Goodrie opinion, suggesting similarities between Felten and Aghnides, were fully answered by highly persuasive visual evidence to the contrary."

Petitioner's contention that the Seventh Circuit's statement that "Felten reads literally on the claims of Aghnides" stands unchallenged, is a mere play on words. The Fourth Circuit says (Appendix, page v) that Felten does not anticipate the Aghnides patent; that the drawings are different; that Felten operates on a different principle;

is designed to achieve a different result; and has never been utilized to achieve the purpose of the Aghnides invention.

Commercial Success.

Petitioner's sta ment that the Fourth Circuit placed great emphasis on commercial success and disregarded the rule of this Court, that commercial success cannot make an invention where there is none, is patently without foundation. The Fourth Circuit merely said (Appendix A, page iv) that the commercial success of the Aghnides aerator was "noteworthy," and recognized that:

> "While it is true that commercial success does not determine either invention or the validity of a patent, nevertheless, in a doubtful case it may be a convincing factor. Great Atlantic and Pacific Tea Co. v. Supermarket Equipment Corp., 340 U. S. 147, 153; Textile Machine Works v. Hirsch Textile Machines, Inc., 302 U. S. 490, 498; Smith v. Ball, 301 U. S. 216, 233."

Felten and Aghnides Differ In Principle.

With respect to the difference in principle of operation between Felten and Aghnides, the Court of Appeals adopted and quoted Finding XXVII (f) of the District Court (Appendix A, page v) which states that in Felten "the energy of water is spent in creating vacuum and not in securing aeration"; that Felten "adds less than 5/10 of a cubic inch of air to 1 cubic inch of water whereas Aghnides' aerator adds 6 cubic inches or 12 times as much"; that Felten secures his result by means of a conically widening chamber which has no counterpart in Aghnides; that Felten "must keep his chamber flooded," whereas the chamber in Aghnides is not a widening one and was not flooded but contained only naked water jets in free air

striking his resistance screens; and that Felten's baskets are not essential to his operation and are not elements corresponding to Aghnides' essential resistance screens or shoulders.

Plainly, these findings show unmistakably and with great particularity the difference in principle between Felten and Aghnides. The Court of Appeals for the Fourth Circuit summed it up as follows (Appendix A, page vii):

> "The foregoing findings are supported by substantial evidence, pointed and convincing, and we are persuaded that they should not be set aside. They show that while in Felten some air was present, increase in the amount of air would defeat the operation of the device, since what was desired was a vacuum; whereas in Aghnides the presence of a large quantity of air was desired to effect aeration, which is the heart of the invention."

With respect to quantitative results, petitioner attempts to show that Felten and Aghnides are the same by comparing the results obtained by testing the Felten device in open court with the statements Aghnides made in his foreign patents as to the results he **expected** his aerator to obtain. Clearly, the proper comparison of results is with the models of Aghnides tested in open court, which showed that the jet produced by the aerator of Fig. 4 of the Aghnides patent contained 81.1% (4.3 cu. in. / 5.3 cu. in.) by volume of air, and the jet produced by the Springflo commercial Aghnides aerator contained 85.6% (6 cu. in. / 7 cu. in.) by volume of air (2 App. 217).

Fig. 8 of the Patent.

The question of the possible effect of Figure 8 of patent 2,210,846 upon the claims thereof was considered fully by the Court of Appeals for the Fourth Circuit on

two occasions: once on the appeal and again on the petition for rehearing of which specific subject was alleged error in the court's ruling on Figure 8.

The only reference to Figure 8 by the Court of Appeals for the Seventh Circuit was an inferential one wherein the court said merely that one form of Aghnides may be used as a vacuum pump.

On the appeal the Fourth Circuit held (Appendix A, page ix):

> "* * * The complete answer is that the claims are not directed to this figure and do not read upon it any more than they read upon Felten. The scope of the claims is controlling, not the figures in the drawing.
>
> "* * * Whether the forms not covered by the surviving claims remain in the patent or are cancelled from the drawings is immaterial, for the claims, and not the drawings, control. We consider it immaterial that Figure 8, which is not covered by any of the claims, was not omitted in the granted patent. *Denominational Envelope Co. v. Duplex Envelope Co.*, 4 Cir., 80 F. 2d 186, 192; *Bassick Co. v. Faultless Caster Corp.*, 7 Cir., 105 F. 2d 228, 231; see also *Freedman v. Friedman*, 4 Cir., 242 F. 2d 364."

These cases cited by the Fourth Circuit fully answer petitioner's contentions with respect to file wrapper estoppel, which contentions amount to an attempt to make Figure 8 into something it actually isn't, by likening Figure 8 to the other figures in the patent. The above cases hold that it is the language of the claims which controls, and not statements of the solicitor in the course of the Patent Office proceeding to obtain the patent. See also *Auto Pneumatic Action Co. v. Kindler & Collins*, 247 F. 323 (C. A. 2, 1917).

In their opinion denying the petition for rehearing the Fourth Circuit again reiterated that the claims of the

patent do not relate to Figure 8 (Appendix A, page xviii). Aghnides testified at length both with respect to Figure 8 and with respect to Felten. He gave reasons why both were vacuum pumps as distinguished from aerators (PA 52-53).

The Patent Office cited Felten and yet the Board of Appeals allowed the claims. Clearly, it did not think they read on Felten.

Actually, Figure 8 is mere surplusage in the patent carried over from the earlier patent application of which the one resulting in the patent, after many changes in the claims, was a continuation in part. As observed by the Fourth Circuit (Appendix A, page ix):

> "When an application for a patent is filed, many forms may be shown and an attempt made to cover them all in the claims as originally presented. During the prosecution of the application, however, the claims may be restricted in the light of the prior art. In the end, only certain of the forms shown may be covered by the restricted claims."

The cases cited by petitioner in an attempt to create a conflict with the Court of Customs and Patent Appeals are not in point.* They do not cover situations where a figure

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* The issue in the *Application of McCarn*, 212 F. 2d 797, 799, was whether a minor modification consisting of an abrupt difference in rate of pitch of a two-part screw was patentable over one having a gradual difference, where the specification stated that the rate of pitch would "depend upon convenience."

Application of Stewart, 222 F. 2d, 747, 754, relates to a chemical, not a mechanical, invention and involves the equivalency of using a spray or a wash in a process for washing a water-soluble emulsion from a plate, where the specification did not indicate any difference. The case relies upon the doctrine of equivalents set forth in *In re Borcherdt*, 197 F. 2d 550 (CCPA) which is strictly limited to chemical cases.

Application of Lindberg, 194 F. 2d 732, 736, has to do with the equivalency of a hydraulic drive with a mechanical drive, where the hydraulic drive was one element in a claimed com-

disclosed in an original application was not covered by the claims which finally issued in a continuation application, and the specification shows that the figure is not an equivalent.

III. No Decision Is Required by the Supreme Court to Forestall Excessive Future Litigation.

Petitioner's contentions with respect to excessive future litigation involving Patent 2,210,846 have already been disposed of by pointing out that the only two cases still pending involving the patent, concern parties hereto or their privies. These are cases brought not by Aghnides or Chase, but by Melard Mfg. Corp., who is bound by the Fourth Circuit decision.

CONCLUSION.

We respectfully urge that the petition be denied.

Respectfully submitted,

ALBERT L. ELY,
EVERETT R. HAMILTON,
Attorneys for Respondents.

October, 1957.

(Continued from preceding page)

bination of elements comprising a spraying device, where a claim of the application broadly covered both a hydraulic and a mechanical drive, and the specification indicated that the two drives were equivalent.